The use of land resources for agriculture in Lesotho

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Dedicated to Tlhaku

ABSTRACT

Subsistence agriculture is the mainstay of Lesotho's economy, and about 85 per cent of the population depends on it. Of the agricultural activities crop raising is the most important. Agricultural land is owned comunally and crop land is, in principle, allocated equitably among the rural households. The prevailing population growth rate is about 2.2 per cent annual, although there has not been any significant increase in agricultural output or in the level of industrialisation.

The initial purpose of the study was to examine land use changes between 1950 and 1976 in part of the Thaba Bosiu Rural Development area, using (a) air photo interpretation (b) field observation and measurement (c) field surveys and (d) questionnaire survey. Results showed that the nature of the changes in land use were symptomatic of a more serious problem of low agricultural production. Further examination of crop production revealed that productivity is low mainly because of adverse climatic conditions, soil erosion and poor management of the agricultural resources.

The study demonstrates that the agricultural land resources are not effectively managed in Lesotho because their management is left largely in the hands of farmers who are technologically and financially ill equipped to cope with a rather harsh physical environment.

To date efforts to improve the management level have shown little positive effects, mainly because the strategies adopted

have not aimed at the core of the problem, namely, the poverty of the users of the land. Given limited development funds and alternative means of making a living, it is suggested that land management and crop productivity could be most easily improved by a system of collective farming, which would be in accord with many existing local institutions as well as being a system which could lead to economies of scale in the use and allocation of development funds.

ACKNOWLEDGEMENTS

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E.M.Makhanya

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ABBREVIATIONS

The following abbreviations are frequently used in the text:

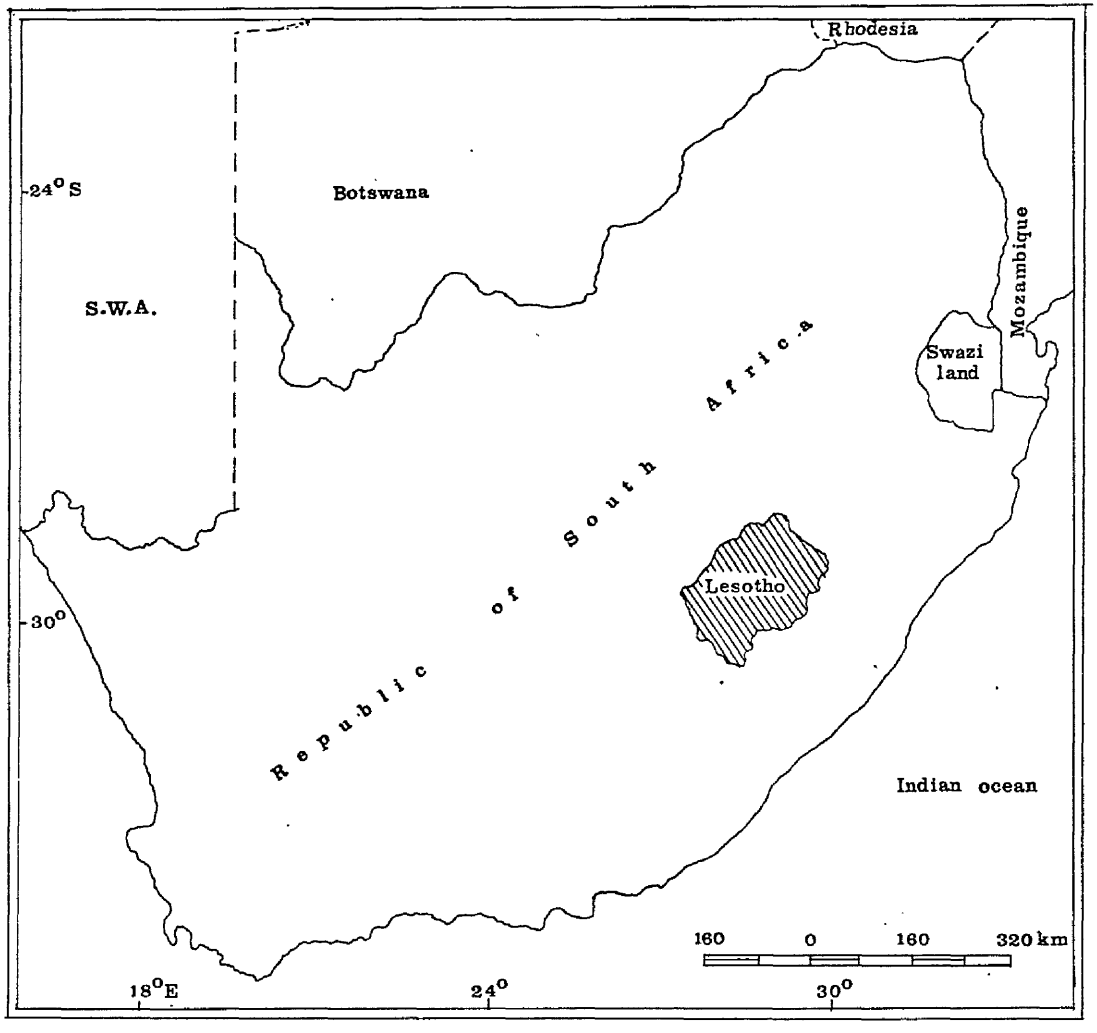
API	Air photo interpretation.
Cm	Centimetre.
DOS	Directorate of Overseas Surveys (Britain).
ed.	Editor or edition.
FAO	Food and agricultural organisation (United Nations).
GDP	Gross domestic product.
Govt.	government.
ha	hectare
HH	households
HMSO	Her Majesty's Stationery Office (Britain).
Kg	Kilogram.
km	Kilometre.
LRD	Land resources division (DOS).
m	metre.
mm	millimetre.
no.	number.
p	page.
pp	pages
SA	South Africa
TBRDP	Thaba Bosiu rural development project (Lesotho).
TBRDPA	Thaba Bosiu rural development project area.
UG	Union Government (South Africa).
UN	United Nations.
UNDP	United Nations development programme.
Univ	University.
vol	volume.

GLOSSARY

Bantu	The term 'Bantu' is used to describe the group of languages spoken in East and Southern Africa. In Nguni languages 'Bantu' means people. In South Africa the term 'Bantu' is used officially to distinguish local black inhabitants from other racial groups. Different writers in Southern Africa use different terms to describe black people in the region, namely, 'Natives', 'Africans', 'Bantu', 'Non-Europeans' and 'Blacks'.
Basotho	The nationals of Lesotho, (singular is 'Mosotho'). European writers have in the past used the term 'Basuto' instead of Basotho.
Basutoland	Taken from 'Basuto', 'Basutoland' was used to describe the territory of Basotho. Most writers refer to pre-independence Lesotho as Basutoland, but Basotho have always known their country as Lesotho. In this thesis the term Lesotho is used more frequently in order to avoid confusion.
Bechuanaland	Pre-independence name for Botswana.
Boer - a farmer	The term is used to describe the early Dutch settlers in South Africa.
High Commission territories	Botswana, Lesotho and Swaziland were, before attaining independence, British protectorates administered by a resident High Commissioner.
Rand (R)	South African currency, also used in Lesotho. one rand = $\pm$ £0.57.

Fig. 1.1

LOCATION MAP



CHAPTER 1

SCOPE AND PURPOSE OF THE STUDY

1.1 Introduction

The study is concerned with the examination of the ways in which the inhabitants of Lesotho used the available agricultural land resources. The term "use" being applied not only to profitable use, but also to misuse and disuse. The study was undertaken on the understanding that man's advanced technical skill and implements can enable him to decide on the type of agricultural activities he would like to pursue and the level of production he would like to attain, without losing sight of the fact that his success or failure depends largely on his ability to overcome the obstacles presented by the environment in which he operates. It was also understood that the quality of land as a means of production in agriculture depends largely on the combination of all its attributes, the capital resources available, as well as on the ingenuity and technical skill of those who use it; that it can be improved with careful treatment and degraded with misuse. Hence, although land is conceived as inelastic (fixed) in areal terms, it is realised that its productivity can be stretched through the careful use of appropriate inputs. It is also realised that such generated increase in productivity of agricultural land are subject to the law of diminishing returns and that there are limits to which man may find it economically advisable to continue increasing inputs for better productivity in agriculture.

1.2 Previous work done that was related to the use of agricultural land resources in Lesotho

From the bibliography given in appendix A, it can be seen that a lot of work has already been done on topics related to the use of agricultural land resources in Lesotho. A brief review will be given of works that have contributed to the advancement of knowledge of the available agricultural land resources and how they were used, in order to demonstrate the contribution made by this study. The purpose of this review is merely to outline previous work done without any attempt to evaluate it except where necessary. The evaluation of relevant literature will be given in the appropriate sections of the thesis.

Almost all written work related to the use of agricultural resources in Lesotho that was undertaken during the colonial period (1884 to about 1960), was sponsored by the British government through the Colonial Office, the Directorate of Overseas Surveys (DOS), the resident colonial administration, and research fellows associated with these bodies. The regular publications by these bodies included the annual colonial reports published by Her Majesty's stationery office (HMSO) and the annual agricultural reports published by the government of Basutoland (Lesotho). Together these reports provided very valuable records of the available resources for agriculture, their use, and the level of agricultural production throughout the years in which the reports were published. However, since the reports were limited to giving annual accounts of the use of the agricultural land resources, they provided little depth into the subject. A list of other reports compiled by agencies of the British government are included in the bibliography (appendix A) and mention will be

made of only the most important ones in this section.

The first research into the agricultural land resources in Lesotho was initiated at the recommendation of the Pim commission (1935). Sir Alan Pim's commission, whose purpose was to examine the financial and economic position of Lesotho, drew attention to the problem of soil erosion in Lesotho and recommended, among other things, the implementation of soil conservation measures. Following the commission's recommendations a director of agriculture was established in Maseru (the capital of Lesotho) and placed in charge of anti-erosion operations. These anti-erosion operations subsequently formed a major part of the colonial administration's efforts to improve the level of agricultural production in Lesotho. Staples and Hudson undertook an ecological survey of the mountain area of Lesotho as part of the effort to combat soil erosion. Their survey included geological and soil studies and in their report, published by the Colonial Office in 1938, they suggested among other things the reclamation of badly eroded areas by relocating villages that were situated in such areas to more suitable ones. Although the report was intended for the mountain areas, its recommendation on the relocation of villages was carried out throughout Lesotho. Staples and Hudson also pointed out that overgrazing was one of the causes of soil erosion.

A reconnaissance geological survey was started in November 1938 by Stockley and his party. The purpose of this survey was to investigate possibilities of the occurrence of mineral deposits of economic importance, but the report, published in 1947, also threw light on the soil and groundwater resources of the territory.

Between 1949 and 1950 Douglas and Tennant were seconded to Lesotho by the Colonial Office to conduct an agricultural survey. The main purpose of the survey was to make an inventory of agricultural resources in Lesotho as a contribution to the world census of agriculture which was initiated by the food and agricultural organisation (FAO). Since the survey was the first of its kind in Lesotho, it was also aimed at providing data for economic development in Lesotho. The survey was based on random sampling and according to Douglas and Tennant's report (1952) it merely provided estimates because of the problems experienced in collecting the data.

Under the auspices of colonial research studies, and financed by the colonial social science research council, Sheddick set out to examine land tenure in Lesotho in about the same time that Douglas and Tennant carried out their agricultural survey. Sheddick's study was requested by the High Commissioner of Botswana, Lesotho and Swaziland, for the purpose of providing facts about native land tenure. Being an anthropologist, Sheddick made a detailed study of land tenure practices in Lesotho from a sociological point of view and his report, published in 1954, provides a valuable record of Basotho's agricultural practices.

In 1959 a commission under the leadership of Chandler Morse was appointed by the British government to conduct a general survey of the requirements and natural resources of the three High Commission territories Botswana, Lesotho and Swaziland. The report of the Morse commission was published in 1960 by Her Majesty's Stationery Office (HMSO). It provided information and recommendations which led, among other things, to the establishment

of more meteorological stations for the provision of climatic data and the beginning of land resource studies by the land resource division (LRD) of the Directorate of Overseas Surveys (DOS).

It should be noted at this stage that up to 1950 there were no aerial photographs for Lesotho. The only map used for all surveys was the 1:250,000 topographic map compiled by Captain Dobson in 1911 by trigonometric triangulation. Hence, although Douglas and Tennant were able to produce an agro-ecological zoning of Lesotho from it, their survey did not provide detailed spatial dimensions of the agricultural land use in Lesotho. The first air photography, covering only the western half of the territory, was taken in April 1950 and the rest of the country was covered in March 1952. The approximate scale used was 1:30,000. After this photography the Directorate of Overseas Surveys produced the first maps of Lesotho with land use details at the scale of 1:50,000. However, since the main purpose of these maps was to portray topographic data, the depiction of land use features in them was rather sketchy. More detailed land use maps were produced from the 1950 photographs for the Tebe-tebeng valley agricultural development scheme by first, the Aircraft Operating Company (AOC) based in Johannesburg, South Africa, and later the Directorate of Overseas Surveys. The Tebe-tebeng valley agricultural development scheme was situated near Leribe; it was started in 1951 but has since been discontinued. The land use maps produced for the scheme were pilot projects, as it were, to determine the possibilities of mapping from air photographs land use information of value to the department of agriculture in Lesotho.

A second air photo coverage for the territory was taken in May 1961 following the recommendations of the Morse commission, and it provided material for the staff of the Directorate of Overseas Surveys in carrying out their land resource surveys. From this photography Bawden and Carroll (1968) produced a soil map, a land systems map and an agricultural potential map, all published at the 1:250,000 scale and covering the whole territory. The maps were accompanied by a very informative report entitled "The land resources of Lesotho". Another report based on the same work entitled "Notes on the soils of Lesotho" was published in 1967 by Carroll and Bascomb. Air photo interpretation in the production of these maps was carried out by means of photogrammetric stereo-plotters and, although no maps depicting the different elements of the land were published, it is implied in the reports that the different elements of the land e.g. soils, slopes, vegetation, erosion etc., were mapped at the various stages of photo interpretation, and that the maps were a product of the combination of all these elements. Apart from the works of Bawden and Carroll there has been to date little, if any, work published that was based on air photo interpretation in Lesotho, and most of the maps produced were based on the 1:50,000 topographic sheets, enlarged photographs, fieldwork and statistical data. In the Thaba Bosiu rural development project use was also made of orthophoto maps produced by Hunting Surveys.

The report of the Morse commission seems to have stimulated wide research interest in Lesotho. Besides the comparatively large amount of work produced by the land resource division of the Directorate of Overseas Surveys after 1960, there was more research work undertaken by people from countries other than Britain and

Lesotho. Their fields of interest were varied, but many seemed to have been interested in examining the land tenure system. It was, however, difficult to attribute the research workers' sudden interest in Lesotho solely to the Morse commission report, since the year 1960 also marked the attainment of independence from colonial rule by many African states and Lesotho's independence (4th October, 1966) was not far off. It would appear that some of the research workers took interest in the territory because of its impending independence. In fact, after independence many people and organisations, including the UN agencies, came to work in Lesotho at the invitation of the government of Lesotho. Among the surveys conducted during this period was the study on water resource development, which was financed by a special fund of the United Nations Development Programme (UNDP). The study resulted in an inventory of the various elements of the land resources and was published in six volumes with accompanying maps in 1972. The dawn of the 1960's was also accompanied by the introduction of more agricultural development pilot projects which could also have attracted the attention of research workers. Before 1960 only three such schemes existed in Lesotho, namely, the Tsǎkholo irrigation dam constructed in the 1930's, the Tebe-tebeng valley scheme (started in 1951) and the Taung reclamation scheme (started in 1956). In 1976 the position of rural development projects in Lesotho was as portrayed in Fig. 1.4. Note that with the exception of the Tsǎkholo irrigation scheme, all agricultural development schemes that were commenced prior to independence were discontinued, mainly because they were not successful.

The most important government surveys undertaken in and after

1960 that provided valuable information on the agricultural land resources in Lesotho were the 1960 and the 1970 agricultural censa, as well as the 1969 prelisting survey, all conducted by the department of statistics in Maseru. The Thaba Bosiu rural development project conducted another prelisting survey covering only its area of operation in 1974.

Among works done for academic purposes,mention could be made of the works of Quirion (1958), Brossard (1959), Stutley (1960). Henry (1964) and Williams (1969). The works of these writers , together with those of others that were not so close to the study of agricultural land resources, are listed under the heading "unpublished research work" in the bibliography. Since a review of bibliography is not a central theme of this chapter, it would not be useful to mention all work done in Lesotho that was related to the topic of this thesis. But by going through the bibliography (appendix A), the reader may become more informed on other works that were not mentioned in this brief review of the bibliography.

1.3 The scope and purpose of this study

Agriculture is the most important sector in the economy of Lesotho with about 85 per cent of the population depending on it. Its contribution to gross domestic product (GDP) was about 41 per cent in 1976. There were, however, a number of difficulties experienced in carrying out farming operations such that the level of production for the majority of farmers was production for subsistence. Any study that was concerned with examining the difficulties of operating farms in Lesotho was important to the territory, which was one of the reasons why this study was undertaken.

The original object of this study was to examine land use changes in Lesotho using the method of airphoto interpretation and field observations. In chapter 2 it will be shown that Lesotho was divided into agro-ecological zones and that the western lowland zone was more densely populated than the other zones. In the lowland zone there were also more agricultural activities as illustrated by the concentration of rural development projects in it (Fig. 1.4). Since the author was resident at Roma, the Thaba Bosiu rural development area in which Roma is situated was a most convenient area for the study. Apart from the fact that the author knew the area well and was in daily contact with it, field checking of photos, as well as other field observations and measurements could be completed very economically from this base. The availability of a wider range of air photographs that provided more scope for sequential studies of land use changes, together with more extensive statistical records, were other factors that favoured the choice of the Thaba Bosiu rural development area for the study. Within the Thaba Bosiu rural development area, the

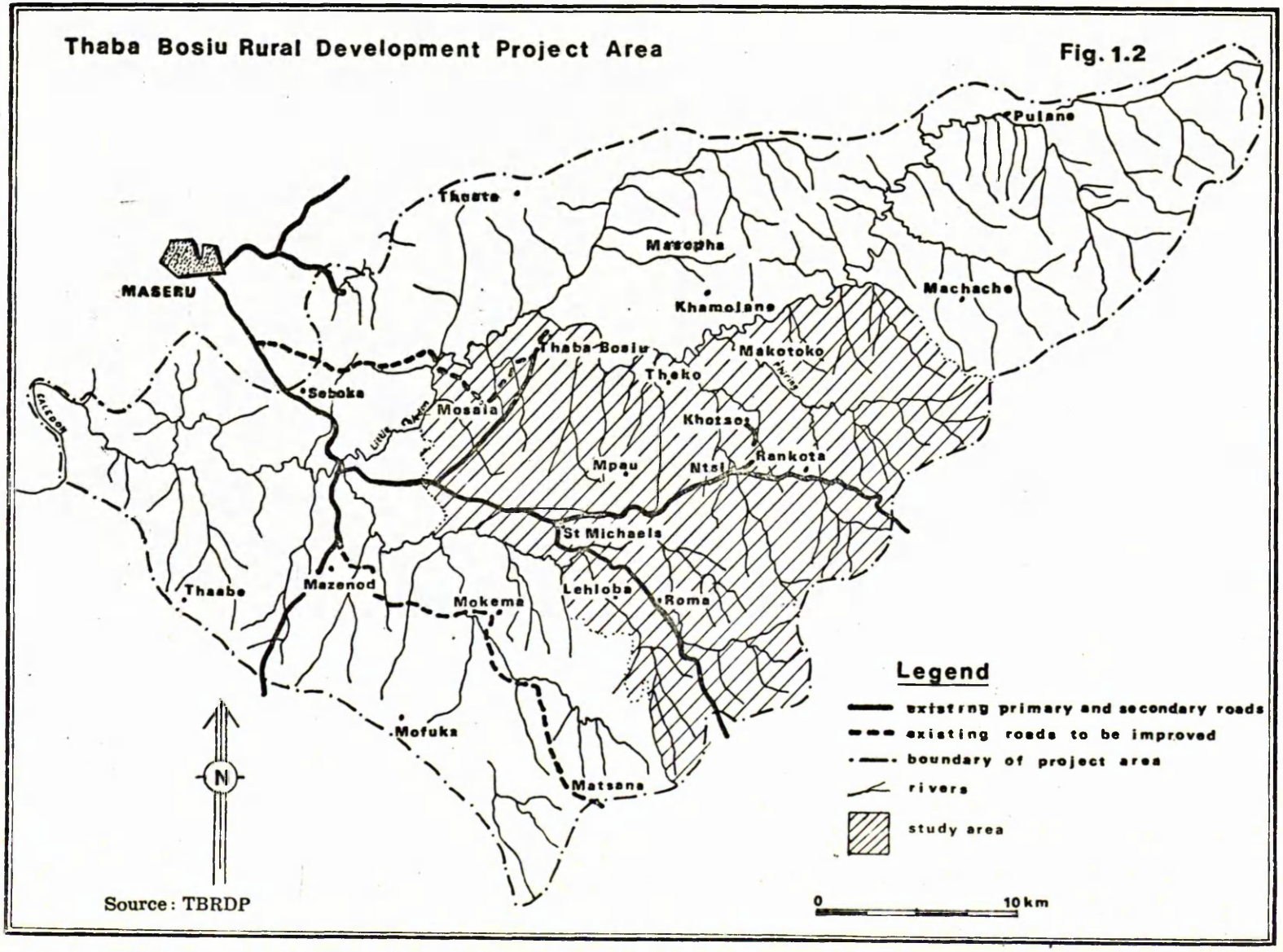
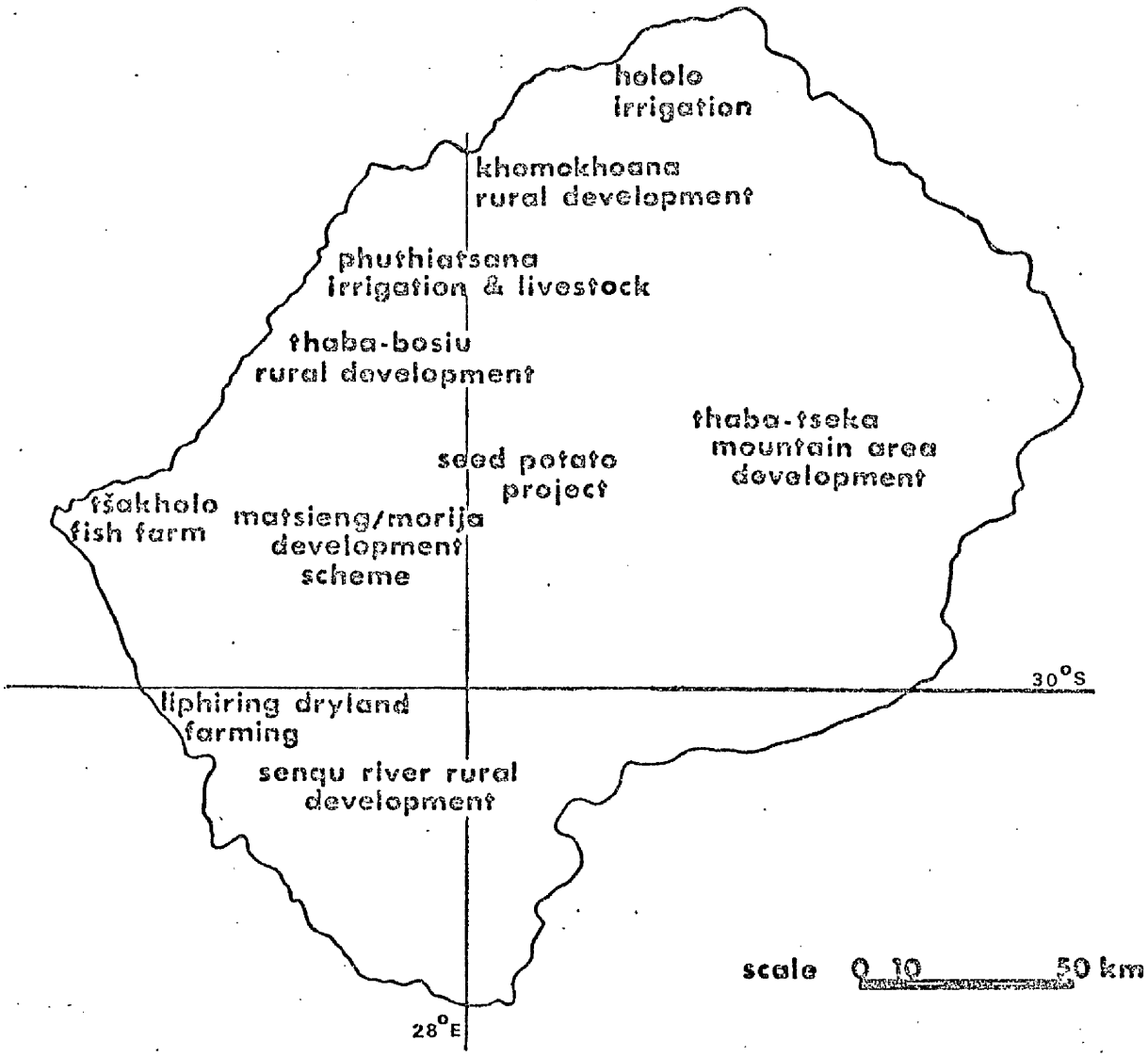

Thaba Bosiu Rural Development Project Area
Fig. 1.2
Pulane
Thaste
Maseqha
MASERU
Machache
Khamolane
Thaba Bosiu
Makotoko
Theko
Seboka
Mossia
Khotsoi
Rankota
Mpau
Ntsi
St Michaels
Thaabe
Mazenod
Mokema
Lehloba
Roma
Mofuka
Matsana
N
Legend
existing primary and secondary roads
existing roads to be improved
boundary of project area
rivers
study area
0
10 km
Source: TBRDP

Fig. 1.4

AGRICULTURE AND RURAL DEVELOPMENT SCHEMES IN LESOTHO - 1976



Source: Second development plan - 1976

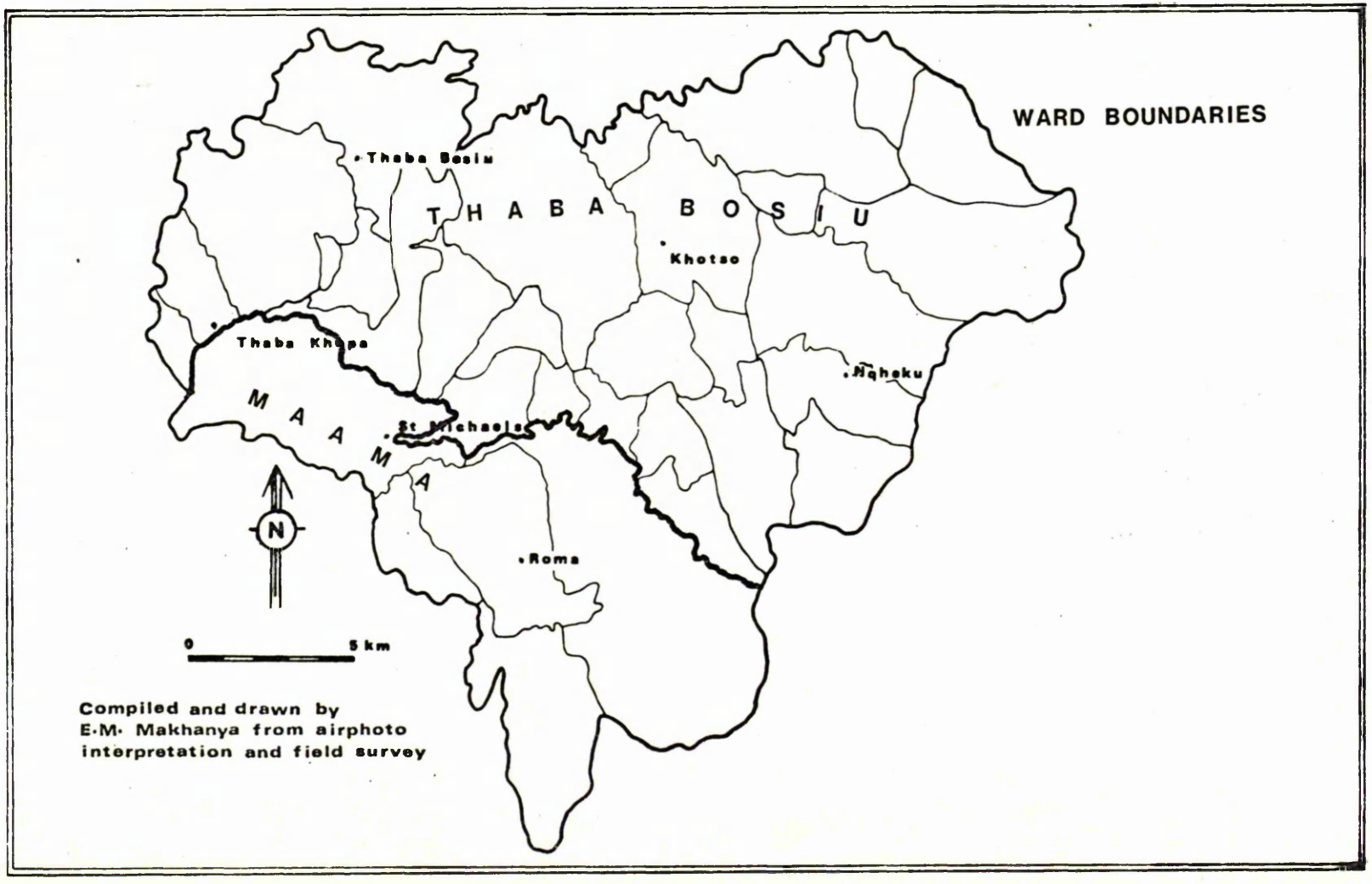
study was confined to area no.1 which is about 36,650 ha (about one third of the total development area) as illustrated in Fig. 1.2. Area no.1 extends over two administrative wards, namely, the ward of Thaba Bosiu and the ward of Maama (Fig. 1.5). This area was ideal for this study because soil conservation works had already started in it when field work was undertaken for the study.

Since the first air photographs in Lesotho were taken in 1950, the study was confined to changes in land use that took place between 1950 and 1976. Air photographs covering the territory of Lesotho as a whole were taken in 1950/52, 1961/62, and 1975. In the Thaba Bosiu rural development area there were additional photographs taken in 1968, 1971 and 1974. In addition to the availability of a wider range of air photographs, there were also orthophoto maps produced by Hunting Surveys from the 1971 air photographs as well as statistical data compiled by both the department of statistics and the Thaba Bosiu rural development project.

The results of the study showed that the nature of the changes in land use, especially the magnitude of the practice of opening up virgin land for cultivation in unsuitable areas, were symptomatic of a more serious problem of inadequate agricultural production. It was thus decided to make a detailed study of agricultural productivity and the factors that influenced it, as a means of examining the level at which the agricultural land resources were managed in Lesotho. A further study of population distribution became necessary in determining the adequacy of agricultural production. Previous writers have referred to the population problem in Lesotho. In 1935, for instance, Sir Alan Pim noted that there was "population pressure" in the territory, and in 1954

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. I.5



Sheddick discussed the question of land shortage. After 1960 most writers wrote on topics related to production shortage in Lesotho, which shows how important the subject was to the territory. Taking account of the available agricultural land resources, productivity, and man/land ratios, the final purpose of the study was to examine the use of agricultural land resources in Lesotho. The Thaba Bosiu rural development area in which field work was done will be referred to as the study area throughout the thesis.

It should be noted that among the works listed in the bibliography very few were produced by geographers. In fact, excluding the possibilities that some authors of articles published in periodicals could be geographers, there were only four writers that were readily identified as geographers in the bibliography, viz. Pollock, Makhanya, Meijs and Smit. This shows that Lesotho has to date been neglected by geographers, and it is hoped that this study will provide a stimulus for further geographical studies that will bring more spatial and regional emphasis to the study of agricultural land use in the territory. Apart from being a geographer's contribution to the study of agricultural land resources in Lesotho, the study has narrowed the gap that was felt by Sheddick when he wrote his report in 1954. Writing on land shortage in Lesotho, Sheddick (p.186) stated that it was not possible to submit the alleged shortage of land to any statistical check, and he expressed the hope that the air photography of 1950/52 would make this possible. Unfortunately no one has to date made use of this photography to measure land shortage in Lesotho. The nearest attempt was that produced by Bawden and Carroll (1968) in their study of the land resources of Lesotho, in which they used the 1961/62 air photographs. The work of Bawden and Carroll presented

useful information on the available agricultural land resources in Lesotho, but since it did not take population numbers into account, it did not provide the full answer on the availability of agricultural land resources. In this study the method of airphoto interpretation was used in the assessment of the agricultural land resources vis-à-vis population distribution and productivity, and it is believed that a more complete picture of the availability of agricultural land resources has been created. However, since this was done over a small part of Lesotho only, it could be argued that the picture was not that complete after all; for this reason the results obtained from the study area were continually compared with national figures. It should be mentioned that a few other writers had done work on man/land ratios. For instance, L.B. Monyake, (1974), a government statistician, used data of population and agricultural censa to examine man/land ratios. The limitations of these national figures were that they were rather generalised and therefore could not be used with precision. Sheddick (1954 p.186) was, for instance, disappointed at the results of the 1950 census of agriculture which he had hoped would provide statistical check in the assessment of land shortage. Although there has been gradual improvement in the method of enumeration, the national figures, especially those of agricultural production, were still mere estimates in Lesotho. The unique contribution of this study was that it was based on direct measurement of both the land resources and population numbers over small areas that could be subjected to any number of checks.

The use of air photographs for enumerating rural population has been used with success by other writers. For instance, Allan and Alemayehu (1975) used the method in Ethiopia, and Dayal and

Khairzada (1976) used it to conduct a population study in Afghanistan. In Lesotho the method has not been used before and Fig. 5.5, which is a dot map based on a detailed photo-interpretation of 1971 and 1975 photos, provides a better idea of population distribution and allocation of agricultural land resources in Lesotho than anything produced previously.

Hamnett(1973) discussed problems in the assessment of land shortage in Lesotho. Among these problems, he mentioned fragmentation of the land holdings, the lack of standard in the size of the fields, the uncultivable character of some of the land, and practices such as paballo whereby chiefs could lease land to adjacent villagers who had no land in their own chief's areas,all of which were the product of the communal land tenure system. Since these factors could have presented similar problems in the analysis of man/land ratios, it became necessary to eliminate them or at least alleviate their effect on the man/land ratios. After much consideration it was decided to first construct a land allocation map (Fig. 3.11) which then formed a base map for all man/land ratio analyses. The method of constructing this map is explained in detail in chapter three. In order to check the effectiveness of this map in eliminating the problems mentioned by Hamnett, a few questions were included in the questionnaire that were intended to provide information on these problems. From the results obtained it could be stated that the map could be used with great efficiency in the examination of man/land ratios in Lesotho. It is hoped that the results obtained by using the map will encourage those concerned with planning in Lesotho to adopt the system of dividing the country into land allocation areas in future census enumerations since it was found to provide very

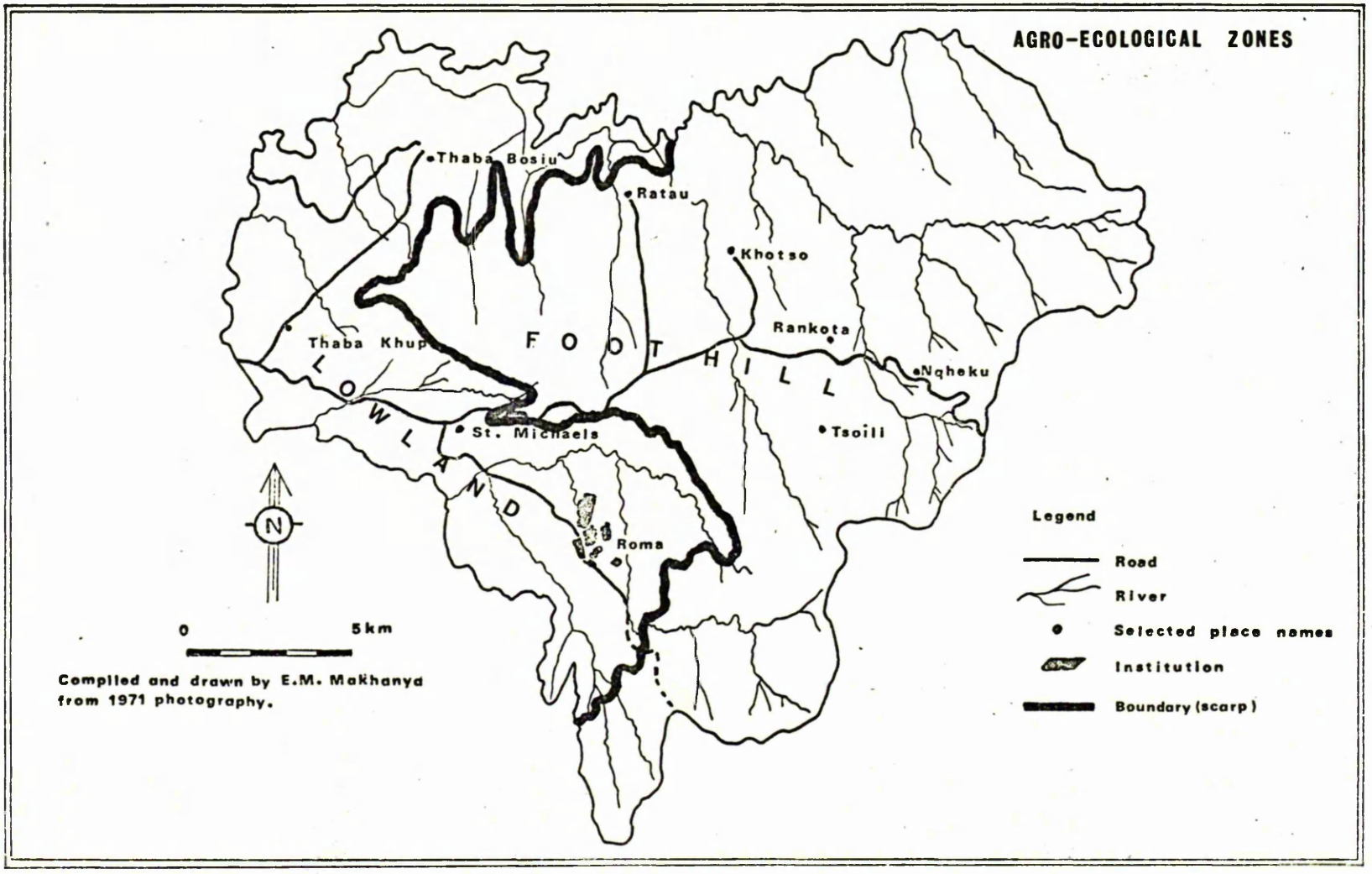
meaningful values in this study.

The problems associated with agricultural land use in Lesotho were many. They include internal problems associated with climate, relief, soils, social organisation, traditions, skill and institutional arrangements for agricultural production, as well as external ones associated with colonialism, and international relations, especially relations with neighbouring South Africa. Some of the problems have already been tackled by previous writers as reflected in the different topics appearing in the bibliography; some have still not been touched. While care was taken to mention the various problems of agricultural production in this thesis, it was not possible within the limited time and financial resources to make a thorough study of all these problems. Emphasis has thus been placed on the examination of the use of the agricultural land resources by analysing the agricultural productivity vis-à-vis population growth in the rural areas. Since most of the people living in the study area, and indeed most of Lesotho's population, depended more on crop raising than on any other agricultural activity, emphasis was placed on the productivity in raising crops. Moreover, whereas it was possible to measure from the photographs the availability of land for cultivation, it was difficult to do the same with grazing land because grazing land was not well defined in Lesotho as will be explained in chapter three.

In chapter two there is a brief description of those features of the study area that will provide the necessary background for the treatment of the use of agricultural land resources (since the available figures were for the most part national ones, these will be used more often). Chapter three describes the methodologies

used in the study. In chapters four and five there are analyses of the data collected for the study, the former concentrating on production and the latter on man/land ratios. Finally, chapter six will give a summary of the main findings and conclusions of the study.

Thaba Bosiu Rural Development Project (Area 1) Fig. 1.6



CHAPTER 2

A BRIEF DESCRIPTION OF THE RELEVANT SALIENT FEATURES OF THE STUDY AREA.

2.1 Location of the study area

The study area is situated in the Maseru district of Lesotho near Maseru, the Capital. Lesotho itself is an enclave in the Republic of South Africa. The territory of Lesotho can be divided into two physiographic regions viz., the mountainous region in the east comprising about 75 per cent of the entire area, and the lowland region of the west. The mountainous region presents difficulties to crop raising as well as to the establishment of communication systems. The study area lies partly in the areas of difficult slopes and partly in the more level lowland area (see Fig.2.1).

Douglas and Tennant (1952) have further divided Lesotho into five agro-ecological zones as shown in Fig.2.2 (because of similarities between the two, the border lowland is usually grouped together with the lowland zone). According to this division the study area is partly in the foothill zone and partly in the lowland zone. These two zones are characterized by a relatively high concentration of people, whose main source of livelihood is subsistence crop raising; they are also characterized by a relatively lower rainfall and a higher rate of soil erosion.

LESOTHO **Fig. 2.1**

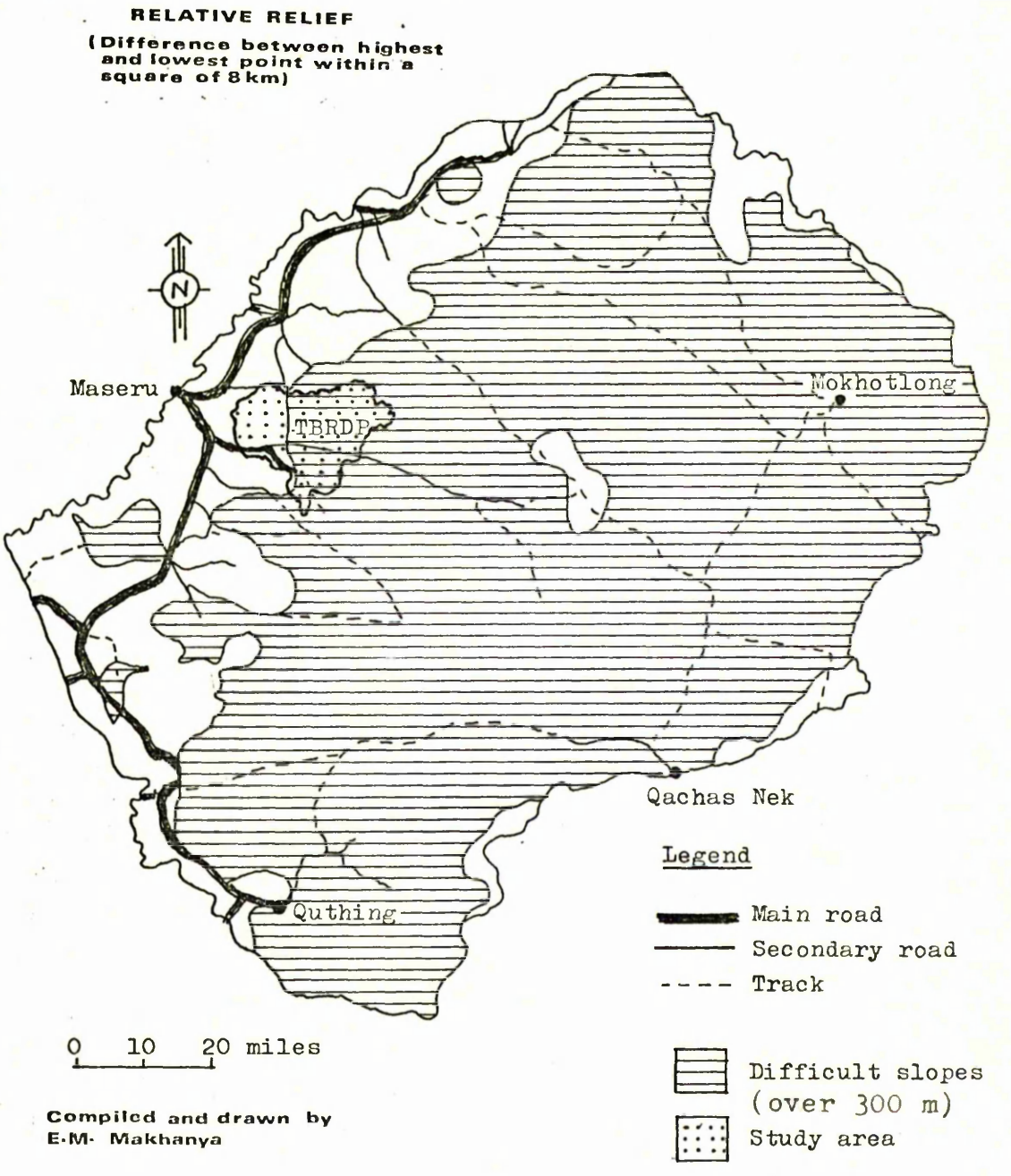
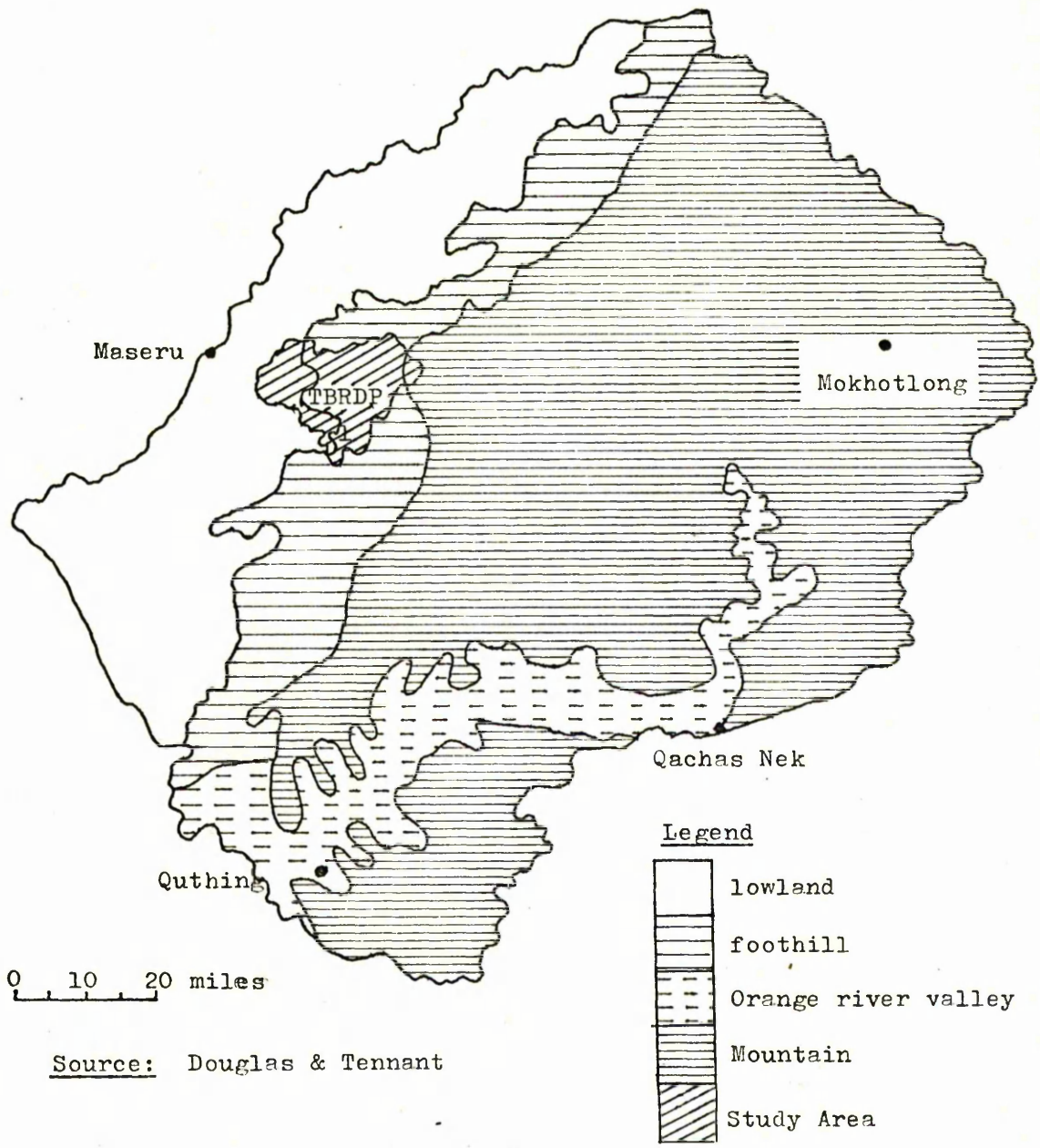


Fig. 2.2

AGRO-ECOLOGICAL ZONES OF LESOTHO



Source: Douglas & Tennant

2.2 Climate

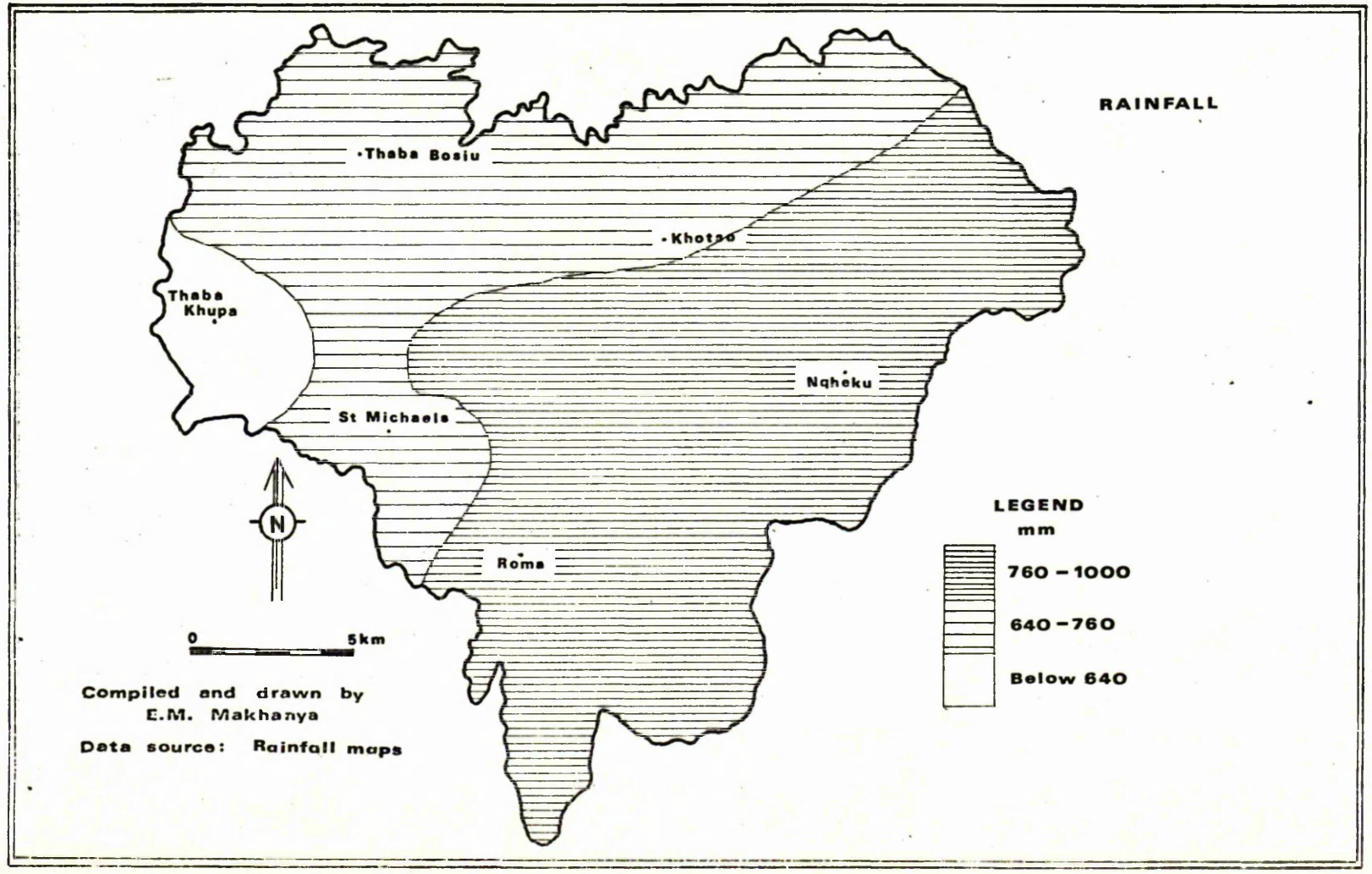
Fig.2.3 shows that the average annual rainfall ranges from 25 inches (600 mm) to 40 inches (1000 mm), The rain falls during the summer months (i.e. October to April), and much of it occurs as heavy thunder showers which are highly erosive. The timing of the rainfall varies and usually causes delay in planting as most farmers will plant only when they see signs of rain. Rainfall is also unreliable as far as quantity is concerned. The unreliability and variability of rainfall causes uncertainty among the farmers and is a negative factor to productivity in agriculture.

The mean temperature during June is about $7^{\circ}C$ ($45^{\circ}F$), and during January it is about $21^{\circ}C$ ($70^{\circ}F$). Frost occurs throughout the winter months and is a powerful agent of mechanical weathering (Carroll and Bascomb 1967, p.6). At times frost occurs during the time when the crops are growing, causing considerable damage.

The less common, but by no means insignificant, obstacles to agriculture in Lesotho are hail, insect pests and snow. Below are a few excerpts from official reports, showing how weather conditions affected agriculture in Lesotho.

> "Good early spring rains fell in 1935 which provided an auspicious opening to the crop season and resulted in extensive ploughing and seeding operations. Unfortunately an exceptionally dry September followed, and as the season advanced the showers that fell were not sufficiently heavy to induce successful germination and crop growth, with the result that many fields had to be re-ploughed and re-sown. These late planted crops were subjected to various set-backs. Unseasonable

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 2.3



> frosts occurred on the 15th November, 1935, and on the 20th January, 1936. These frosts caused considerable damage, particularly to mountain maize and wheat;" (HMSO 1937, p.10).
>
> ".....The rainfall of 32 inches was three inches above the average and accounted for the excellent yields of all crops - the best in five years. Unfortunately it rained rather late into the harvesting season, thus delaying the ripening of the maize and Sorghum crops, which were later damaged. " (HMSO 1949, p.3)
>
> "Thousands of livestock died in the winter of 1949 the grazing being very poor as a result of the drought."(HMSO 1950,p.1).
>
> ".....There was a severe drought during the latter half of the year and the prospects of a good maize harvest are very poor." (HMSO 1964, p.43).
>
> "Weather conditions during 1965 were not helpful. A period of drought during February and March prevented the grain crops from swelling fully. Sharp frosts at the end of February also caused much damage to the summer crops." (HMSO 1967, p.24).

At planting time towards the end of 1975 it rained continuously, and many people could not plough their fields. During the first month of field-work for this study (i.e. February, 1976) it rained so much that weeding operations could not be carried out because the fields were soaked. The maize and bean crops were in many fields damaged, and a large quantity of soil was eroded.

The 1970 agricultural census revealed the fact that out of a total of 402,220 fields planted to crops, 28.41 per cent failed. Table 2.1 shows that in terms of number of fields, drought was responsible for about 47 per cent of the total failure in crops; in terms of area the figure was 78 per cent.

Table 2.1 Crop failure in Lesotho by causes

Cause	Number of fields	area (ha)
Frost	3,839	1957
Hail	2,598	2397
Drought	53,488	39184
Cutworm	2,425	1034
Others	51,924	5816
Total	114,274	50388

Source: 1970 Census of agriculture

2.3 Geology and Relief

Lesotho is underlain by sediments and basaltic lavas of the Karroo System. The sedimentary rocks of the lowlands, which were laid down in a shallow basin, were capped by basaltic lava (Bawden & Carroll 1968, p.10). Numerous dolerite intrusions occur both as dykes and large sills. Table 2.2 illustrates the geological succession in Lesotho. The distribution of the rocks in the area are as shown in Fig.2.4 The boundaries between basalt and the sedimentary rock is in most places marked by prominent scarp faces (see Fig. 2.5). There is a correlation between geology and relief in the study area.

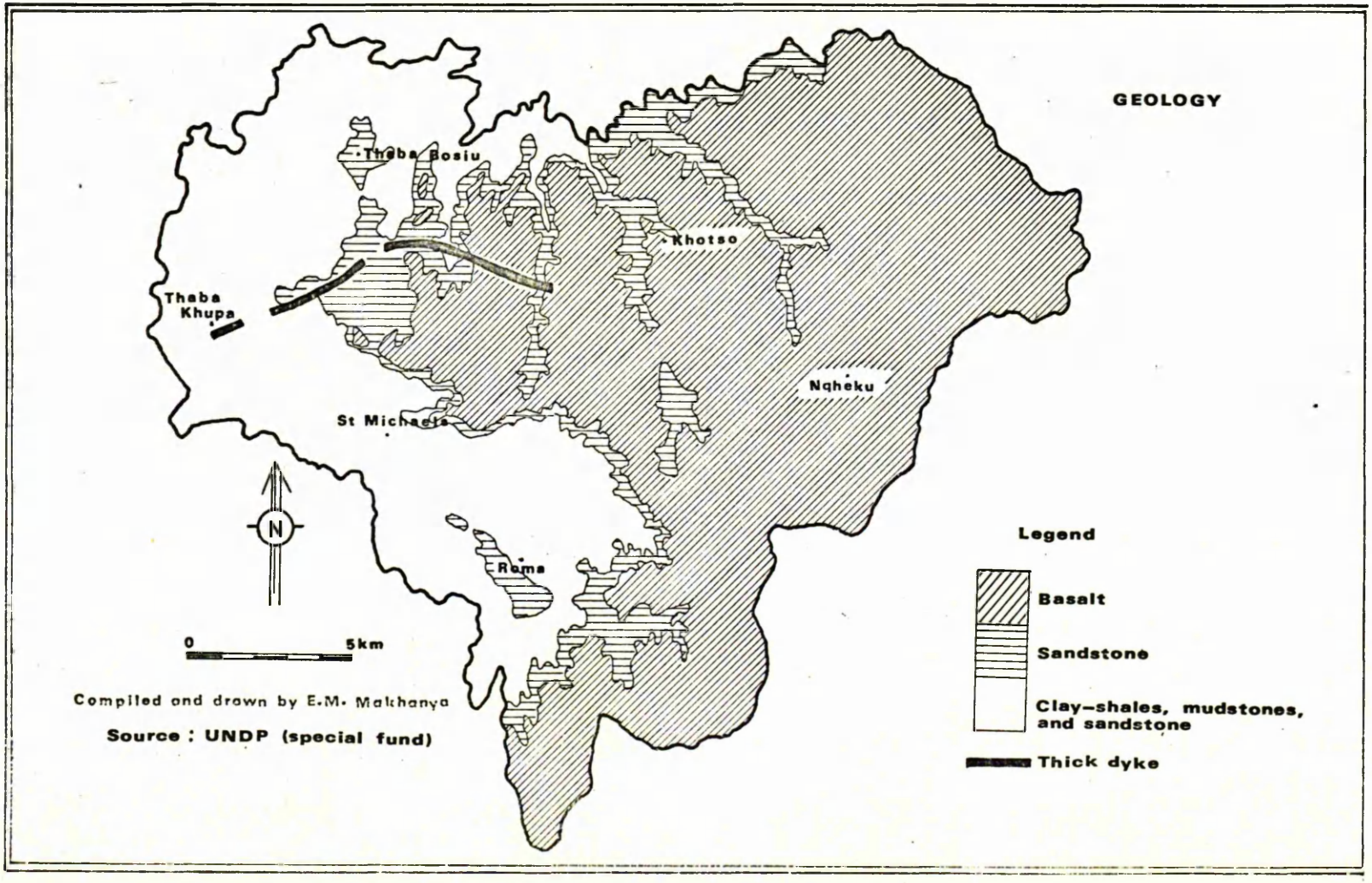
Table 2.2 The geological succession in Lesotho

Series	Formation	Lithology	Age
Stormberg Series	Drakensberg Beds	Basalt	Lower Jurassic
	Cave Sandstone	Sandstone	Triassic Rhaetic
	Red Beds	Sandstones: shales	
	Molteno Beds	Sandstones; grits	
Beaufort Series	Upper Beaufort Beds	Shales; Sandstones	Triassic
		Dolerite	Rhaetic + L.Jurassic

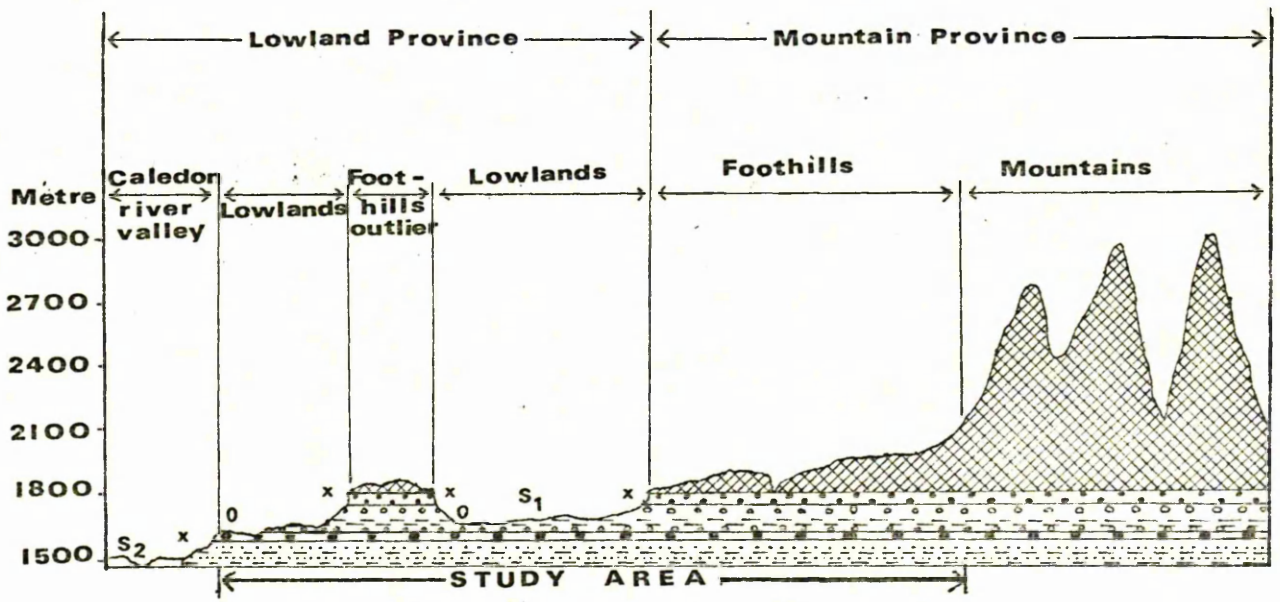
Source: Bawden & Carroll, p.10

The elevation of the area is between 1,540 metres (5,050 ft) and 2,530 metres (8,300 ft). This gives a difference of 990 metres (3,250 ft), and all within an area of only 36,650 ha that made the area rugged. A relative relief map Fig. 2.6 shows

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 2.4



SIMPLIFIED PHYSIOGRAPHIC AND GEOLOGICAL SECTION OF LESOTHO FIG. 2.5



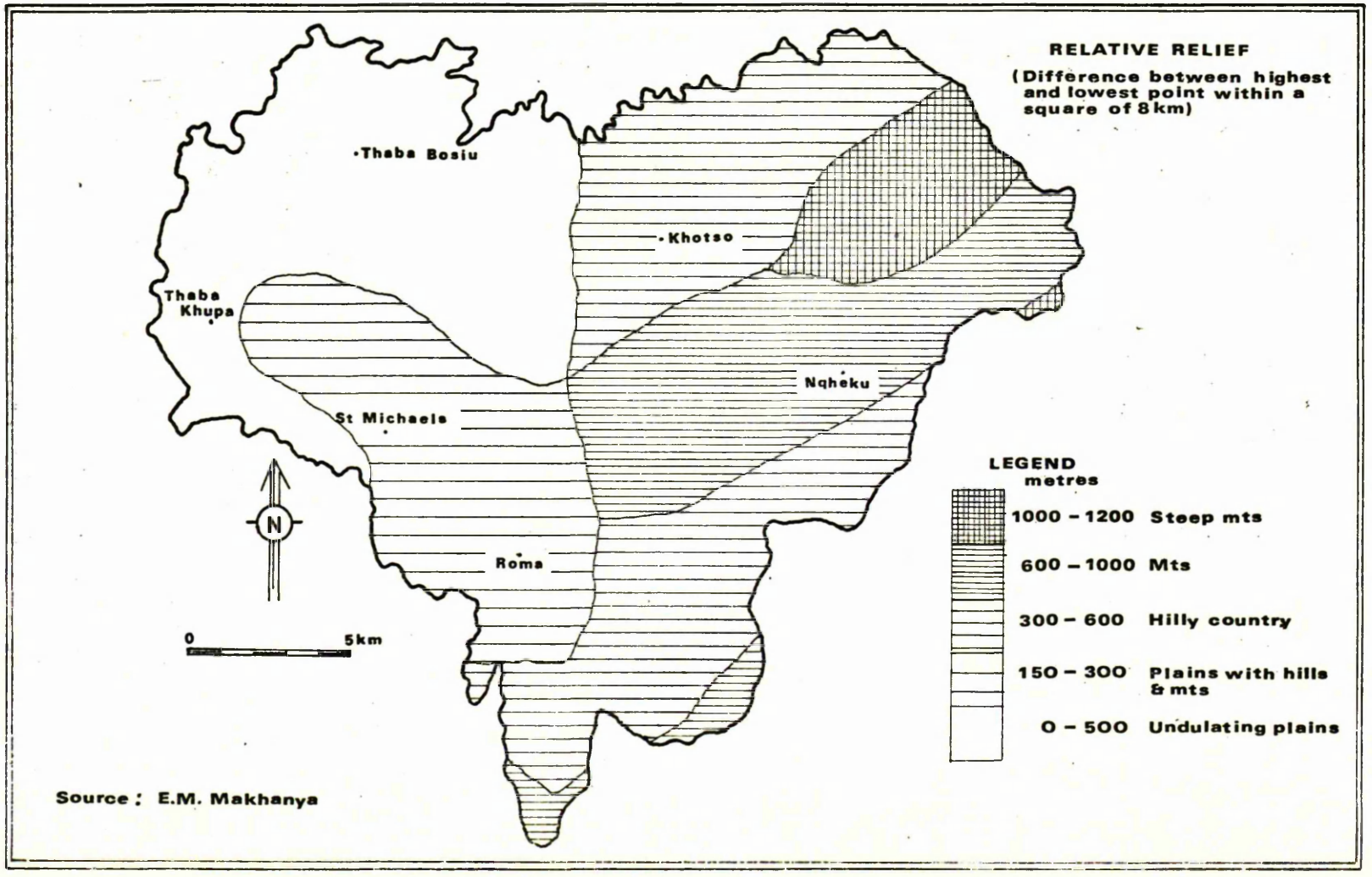
Legend

alluvium
basalt
cave sandstone
transition beds and red beds
Molteno beds
Beaufort series

x sandstone scarp
S_1 old lowland erosion surface
S_2 present multiple erosion surface
0 degraded lowland terrace

Source : UNDP (Special fund)

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 2.6



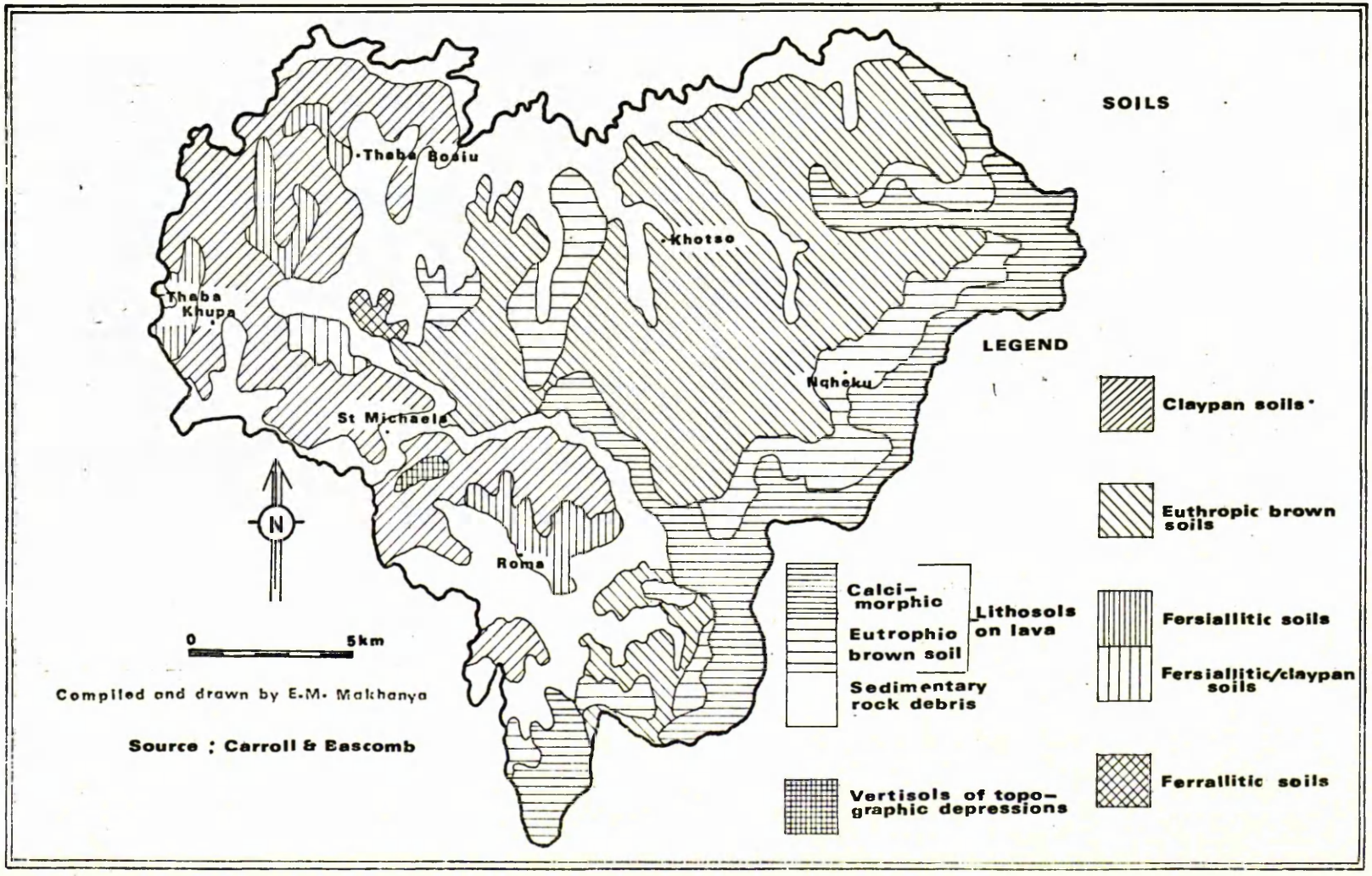
the spatial variation of the degree of ruggedness in the study area. According to Carroll and Bascomb (1967) the broken and hilly topography of much of the Molteno and Red Beds (which characterize the study area) has been produced by headward stream erosion and slope retreat. The area is thus rugged, and this is one of the factors which exposes it to erosion by running water. Ruggedness of the study area also presents difficulty in agriculture and transportation.

2.4 Soils

The reports of both the ecological survey conducted by Staples and Hudson (1938) and the geological survey conducted by Stockley (1947) show that the types of soils found in Lesotho depended much more on geology and relief than on the other soil forming factors. According to Stockley (pp.91-92) soils derived from basaltic rocks (i.e. soils of the mountain and foothill zones) were fertile and needed little, if any, fertilizers, whereas the lowland zone which consists of a belt of sedimentary rocks had poor sandy soils lacking in lime, phosphates, potash and available nitrogen. Carroll and Bascomb state that soils derived from Molteno sandstones had a much higher content of medium and coarse sand than soils derived from other sandstones in Lesotho, and that the texture of the soils derived from the fine-grained red beds were dominated by the fine sand fraction (Carroll and Bascomb 1967, p.3).

A significant feature of the soils of Lesotho was their erodibility. Being influenced, among other factors, by soil type, soil erosion in Lesotho was also largely dependent on geology and relief. In the lowland zone the various horizons of fine-grained sandstones gave rise to widespread gully erosion and in general the sub-soil erodes more easily than the top soil. In the mountain and foothill zones the volcanic soil is loose and friable in texture and the top soil erodes more easily than the sub-soil. The result is that whereas gully erosion is a spectacular feature of the lowland zone, sheet erosion is more characteristic of the mountain zone (Staples and Hudson 1938,p.37).

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 2.7

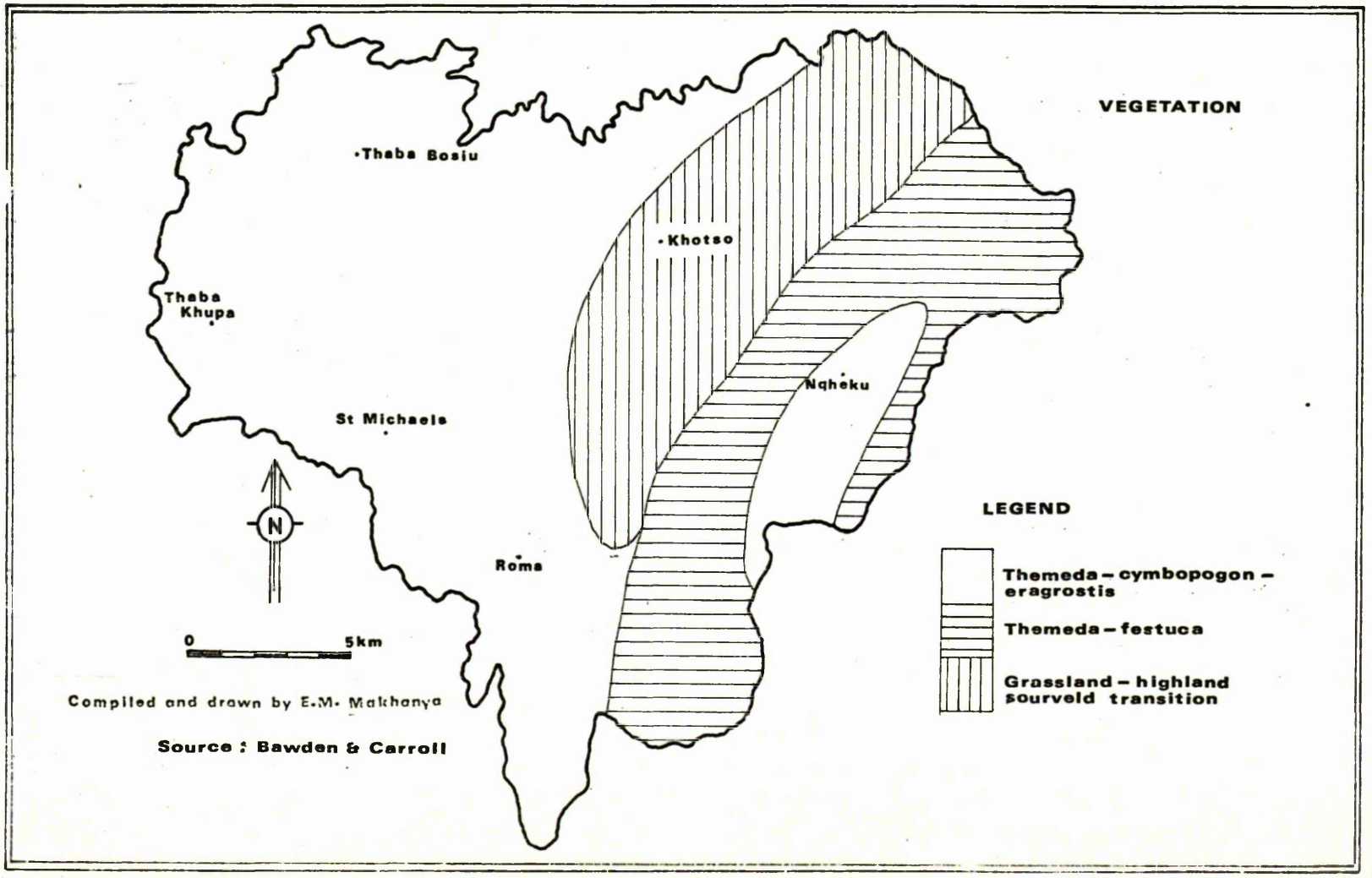


The type of soils found in the study area are as shown in Fig. 2.7. Fig.2.7 was extracted from the soil map compiled by Bawden and Carroll in 1966. The units shown on the soil map were produced by combining similar landscape elements; the boundaries of each mapping unit therefore separate areas that are both physiographically and pedologically distinct (Carroll and Bascomb 1967, p.21).

2.5 Vegetation

There is almost a complete absence of natural tree growth in Lesotho. This absence of natural trees exposes the soil to detachment by direct impact of the raindrops, particularly as the rainfall is of high intensity. The country is characterized by grasses, classified into six vegetation mapping units by Bawden and Carroll. In the study area only three of these units occur; their distribution is as shown on Fig.2.8. Of importance to this study is the fact that the grass cover in most areas is not dense and offers little protection against erosion (refer to Bawden and Miller 1961).

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 2.8



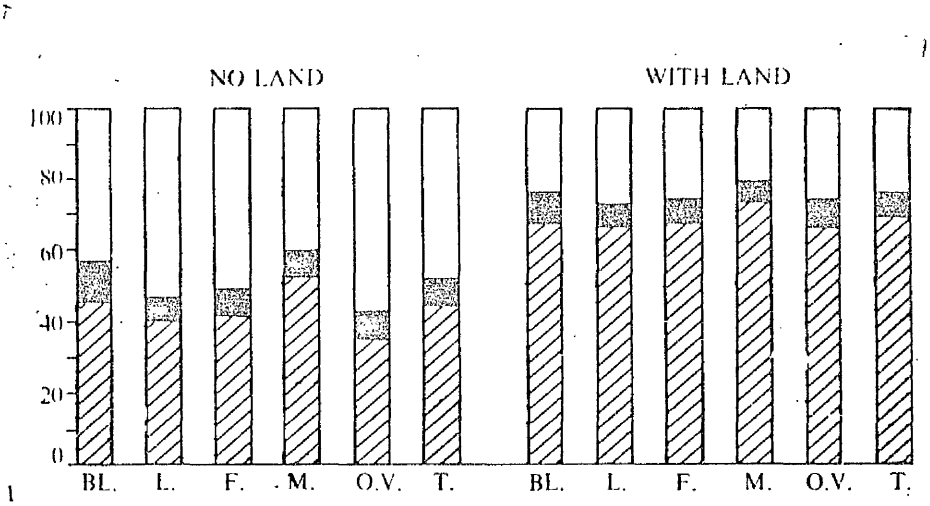
2.6 Agriculture

Lesotho's production was almost entirely confined to an agricultural economy. About 85 per cent of the population was dependent on agriculture and the majority of the landholders operated at a subsistence level. As in all subsistence economies there was a tendency for people to produce more of the staple foodstuffs (i.e. maize to a large extent and sorghum to a lesser extent) than any other commodity. Hence, although the physical environment of the territory was more conducive to livestock farming than to agronomy, Basotho attached more importance to the latter. This was evidenced by the fact that there were more rural households without livestock than there were without land for cultivation (see Figs. 2.9 and 2.10).

As reflected in Appendix H wool and mohair have been the most important export commodities in Lesotho. The value of wool and mohair export has, however, been fluctuating with fluctuations in prices, supply and demand. Appendix H shows that the value of the other export commodities of Lesotho also fluctuated from year to year. This was characteristic of all agricultural produce. It will, however, be demonstrated in chapter four that in Lesotho the situation was aggravated by the unreliability and variability of the rainfall which caused general fluctuations in agricultural productivity. Because there were few alternative means of making a living, Lesotho's economy depended largely on agriculture in spite of the difficulties presented by the physical environment on agricultural production. The contribution made by the agricultural sector to gross domestic product (GDP) was about 40 per cent (Lesotho Govt. 1976, p.2).

Fig. 2.9

Percentage of householders residing at given places by ownership of land.



Absent from Lesotho

Absent but in Lesotho

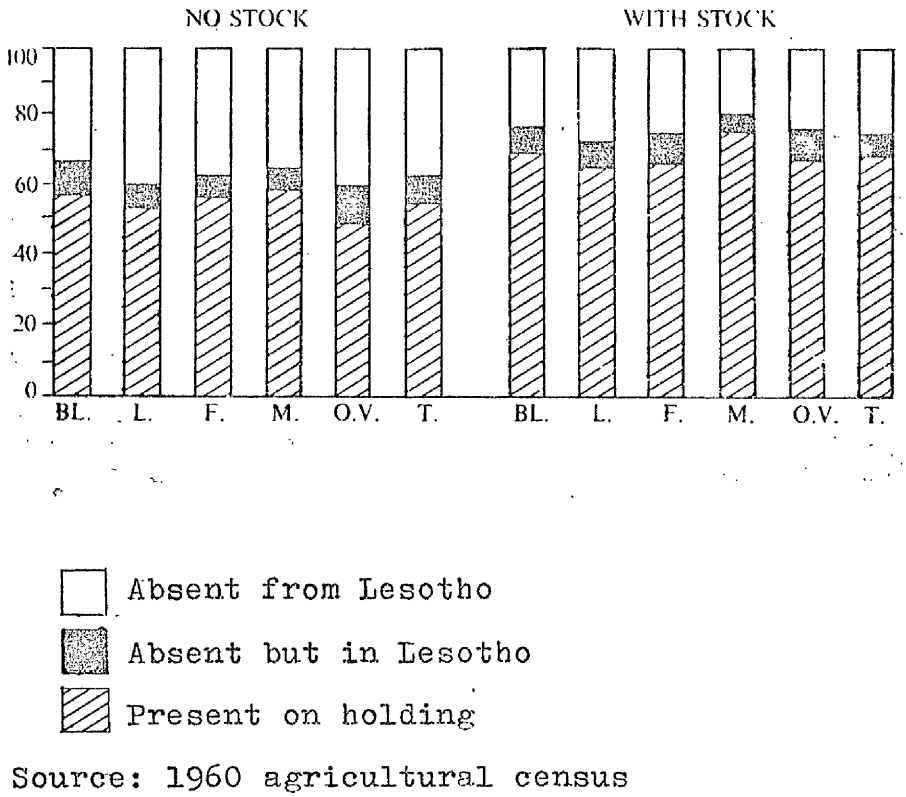
Present on holding

BL = border lowland, L = lowland, F = foothill, M = mountain, OV = Orange river valley, T = territory.

Source: 1960 agricultural census

Fig. 2.10

Percentage of householders residing at given places by ownership of stock.



Source: 1960 agricultural census

2.7 Mining

A geological survey conducted between 1938 and 1940 found that there was little chance of any mineral development in Lesotho (Basutoland Govt. 1952, p.32). After some traces of diamonds were found in the Orange River, a reconnaissance survey for the stone was started in 1955 which covered the whole territory. The more promising results were from pipes at Letseng-la-Terai, Kau and Liqhobong - all in the highland areas. Occurrences, however, were not regarded to justify full scale mining operations, and in 1961 exploitation of the diamonds was left to individual licensed diggers who used pick and shovel methods. The value of diamonds produced this way has been on the average between two and three per cent of the national income. Recently the De Beers mining company after two years of prospecting made an agreement with the Lesotho government to establish a mine at Letseng-la-Terai and at the time of writing construction work was already in progress. It is hoped that the mine would greatly increase the production of diamonds after it goes into operation.

2.8 Manufacturing

Up to 1965 there were in Lesotho only 13 manufacturing and ten building industries, employing a total of 1,385 people (Lesotho Govt. 1967, p. 23). In 1963 an economic planning council listed a number of reasons why the territory lacked industries. Among the reasons given were: lack of resources, lack of skill, land tenure, high company tax, lack of housing and social amenities. But one of the main reasons for the lack of industries in Lesotho at that time was the passive policy of the British administration which, until 1950, had thought that the territory would ultimately be incorporated into the Republic of South Africa (Leistner 1966, pp.29 and 37).

It was only after 1960 that more positive steps were taken towards industrialisation by the establishment of the Basutoland Factory Estates Development Company (BAFED). After independence the functions of BAFED were taken over by the Lesotho National Development Corporation (LNDC) that was established in 1967 to raise the level of income and employment in the country. Since its inception the corporation has been instrumental in attracting 45 subsidiary companies, joint ventures, and associated enterprises which have provided more than 3,500 jobs (The Times, 27.11.76).

2.9 Trade

Throughout the pre-independence period Lesotho's exports consisted almost entirely of unprocessed agricultural commodities. Wool and mohair were the main exports followed by wheat, sorghum and cattle. The imports were mostly manufactured goods (including foodstuffs), machinery and transport equipment. The foodstuffs included commodities such as wheat meal and maize meal which would normally have been produced locally if there were mills (see Appendix H).

The trade figures (Fig.4.3) show marked fluctuation that is characteristic of agricultural commodities because of fluctuation in their production, demand and price. For instance, when there was a shortage of food in Lesotho, such as during the years 1951 and 1955 imports were increased and exports decreased (HMSO 1952, p.2 and 1956, p.38); in 1958 there was a considerable fall in exports due to the fall in the wool market (HMSO 1959,p.45), and when the price of wool and mohair fell during 1954 and 1960 so did the value of exports (HMSO 1955,p.7 and 1962, p.59).

Fig.4.3 shows that since 1929 the value of imports has always exceeded the value of exports, thus presenting the territory with an adverse balance of trade. After independence the situation was slightly improved by the establishment of local mills and industries, as well as by increases in the production of diamonds which in 1967 were second only to cattle in export value.

2.10 Revenue and expenditure

Up to the 1936/37 financial year, Lesotho's territorial revenue exceeded expenditure. After the Second World War, however, Lesotho's revenue fell short of expenditure and the deficit was met by a Colonial Development and Welfare (CD & W) fund from the British Government (Appendix H). The gap between territorial revenue and expenditure has since been continually increasing, and by the 1964/65 financial year the territorial subsidy was more than the territorial revenue. This sudden increase in the budgetary deficit partly reflects the accumulated under-development (or neglect) of the territory which resulted from the reluctance of the colonial administration to invest in development projects in Lesotho, since there was no immediate profit to be gained by doing so (Henry 1964, pp.220-226, Leistner 1966, pp.29 and 37). The colonial administration's reluctance to invest in development projects in Lesotho was explained at length by Cassidy (Cassidy 1967, pp.6-9). Cassidy stated that the guidelines for setting up an annual budget for Lesotho was a simple one,namely, that expenditure should not exceed revenue.

Throughout its reports the colonial administration had continually expressed concern about the fact that Lesotho's economic future depended on agriculture, and that the future of agriculture depended on soil conservation. Hence in its budget for the 1960 - 1964 development programme about 41 per cent was allocated to soil conservation and 2.4 per cent to agricultural training. Besides these two activities there was nothing else done to the improvement of agricultural production (Basutoland Govt. 1960, pp.2 - 3).

When the government of independent Lesotho took office in 1966 emphasis was placed on increasing yields and shifting towards the raising of cash crops (Lesotho Govt.(a),1970, p.56). Yet although about 85 per cent of the population depended on agriculture, and although agriculture contributed about 45 per cent to Gross Domestic Product (GDP), only 22.7 per cent was allocated to it in the budget for the First Five-Year Development Plan for the territory (1969/70 - 1974/75). However, in the Second Five-Year Development Plan (1975/76 - 1979/80) the allocation for the development of agriculture and rural development was increased to 31 per cent of the budget.

2.11 Standard of living

The gross domestic product (at factor cost) for 1967/68 was R55.6 million to which agriculture contributed about 40 per cent, the tertiary sector about 57 per cent and the secondary sector only about 2.4 per cent (Lesotho Govt.(a), 1970). The fact that the contribution by the secondary sector to GDP was so low reflected the magnitude of dependence on agriculture, a factor that made the economic structure of Lesotho particularly imbalanced. The estimated *per capita* income was about R56 per annum. There was, however, such high disparity between the wages and salaries, especially between those earned by Basotho and those earned by non-Basotho, that in 1970 the *per capita* incomes of over half the adult farm population was still less than R30 per annum. According to Ward (1974) only about one per cent of all farm adults derived adequate incomes from agriculture. Judging by world standards, the level of living in Lesotho was very low.

2.12 Land Tenure

A few books and articles have already been published on the land tenure system in Lesotho. The publications by authors such as, Sheddick 1954, Henry 1964, Cowen 1967 and Wallman 1969, Stevens 1970, Williams 1972 and Hamnett 1973 were based on fieldwork and they reveal a number of interesting features of the land tenure system of Lesotho. It is not intended in this section to give an analysis of the whole range of social, economic and political implications of the system - rather a brief exposition of selected features of the system that were connected with rural land use will be given in order to show how they were related to change in land use.

The traditional system of land tenure in Lesotho was communal in the sense that all land belonged to the nation. The land was allocated to the people, and the power to allocate land was vested in the office of the King who acted as trustee for the nation (Lesotho Land Act 1973).

The prevailing communal system of land tenure practised in Lesotho was, with some slight modifications and adaptations, as it was when the nation was founded. It was a national motto of Basotho that "land belonged to the King in trust for the nation". During the period 1836 to 1870 Basotho experienced difficulties concerning land ownership with the Boers who emigrated from the Cape Colony in what was termed the "great trek". Pursuing game and pasture, parties of these Boers came as far as the Basotho frontier, remaining at first for short periods only. They were not disturbed, but as time went on their visits became so

prolonged as to assume the appearance of permanent settlement. According to a memorandum written at the dictation of Moshoeshoe I, King of Basotho, he regarded these visitors as tenants to whom he had assigned a resting place (sojourn) without waiving his right and title of Over-Lordship (Sauer and Theal 1883, p.36). The emigrant boers, however, being aware that no defined territorial boundaries existed, claimed as of right the ground upon which they had settled, on the plea that being derelict, it was theirs by virtue of occupation (Lagden 1909, p.64). This difference in the concept of land ownership resulted in a series of disputes and wars during which Basotho lost considerable land. Consequently, Basotho adopted the principle of inalienability of their land which was declared before a Commission of Law and Customs in 1873 - a principle that was still strongly upheld. The principle of inalienability of their land was strengthened by the fact that during the colonial period there was continued effort to incorporate Lesotho into the Union of South Africa, the idea having been abandoned only in 1950 when the nationalist government in South Africa adopted the policy of apartheid.

2.12.1 The allocation of the land

Although the power to allocate land was said to be vested in the office of the King, the King did not in actual practice allocate land. It was the chiefs and headmen who did the allocation on behalf of the King. The power of the King, chiefs and headmen to allocate land was not necessarily a right as some writers infer. It was a duty (The Laws of Lerotholi p.6, Chieftainship Act No 22 of 1968) and if it did assume the

character of a right, it was because of misuse of the duty by some of the administrators of the land. The chieftainship system was actually an "institutional mechanism whereby the national ownership of the land is given practical expression" (Hamnett 1975, p.63).

Traditionally land was granted to individuals solely for subsistence of the family group and it included a residential site with or without a garden, depending on local conditions, and three parcels of land for cultivation. There was no standard acreage laid down with regard to the size of these parcels and they differed according to topographic conditions averaging in 1937 two acres (0.81 ha) in the mountain zone and three acres (1.21 ha) in the lowland zone (HMSO 1937,p.10). The standing of the individual was usually taken into consideration in determining the number of land parcels he should be granted. For instance, chiefs usually got more land parcels than commoners, and in the past polygamists got extra land for each additional wife.

Grazing land and lands containing commodities such as building material, fuel, wild plants, etc. were used communally; they were not allocated to individuals, but individuals could obtain the right of access to them. After the harvest the chief traditionally opened the lands to common grazing and during this period the individual's rights over his arable lands were temporarily suspended.

The foundations of the land tenure in Lesotho was equity and subsistence (Clauson 1953, p.5). This meant that the size

of land a villager held was determined more by what was regarded as his needs for subsistence and not by his ability to use it, or by his dedication to farming. According to Williams, this principle of equity and subsistence militated against the rise of the true farming class in Lesotho (Williams 1972, p.6).

2.12.2 The right to use land

As has already been stated rural land was granted to individuals primarily for subsistence. In the rural areas every family head had a right to land (provided that the land was available). The right to land that a rural landholder enjoyed was of course, only usufructuary. When the landholder ceased to use the land, such as during the period when the lands were open to common grazing, his right to the land was greatly reduced; and when, in the opinion of the chief and his advisers, a landholder was for some reason or other failing to cultivate his land, he may have to forfeit it so that someone else could use it.

Since the control of land was vested in the chieftainship, villagers could not do as they pleased with their share of the land; the allocation of the land was made for a specific purpose (i.e. cultivation, or gardening, or building, etc.) and villagers could not deviate from this purpose without prior consent of the chief. They could not, for example, plant trees on arable land without the permission of the chief (Duncan 1960, p.95) and although no law existed against fencing of arable lands, the chiefs discouraged it. Some villagers were further restricted in their choice of crops by the fact that at certain times of the

year, i.e after the harvest of the traditional crops, the fields reverted to communal grazing. As a result of the fact that the right to land was limited to specified usufruct coupled with other factors such as climate, there was general lack of enthusiasm to farming among the average villagers, which was often interpreted as resulting from insecurity of tenure by some writers (see Williams 1972, pp.7 - 10). The feeling of insecurity here was rather exaggerated since no chief had powers to confiscate the lands of his subjects without a very good reason; even then the subject had a right of appeal through senior chiefs (refer to The Chieftainship Act No.22 of 1968, Legal Notice No. 50 of 1969, Melaoana ea Mobu, 1973 and Land Regulation, 1974).

As will be shown in chapter four the lack of enthusiasm resulted from a number of factors such as climate, soil erosion, the small size of land holdings etc. which resulted in low yields. Lack of enthusiasm was further accentuated by the traditional practice of migrating to the towns and mines for employment. Working in the towns and mines offered better - though short term - remuneration than farming. As a result the agricultural production target among the average villager was production for subsistence.

2.12.3 Changes in the system of land allocation

The system of allocating land in Lesotho has been continually, but very gradually, amended because of:

(a) The need to guarantee that land was allocated fairly and impartially (Laws of Lerotholi, p.6): for example, whereas in the past a chief acted alone in the allocation of land to his

subjects, nowadays he does the allocation in consultation with an advisory board elected by the villagers.

(b) The need to adjust to the relatively decreasing area of arable land: whereas the traditional quota was three parcels of land to a family, nowadays families have to do with less or with none at all.

(c) The need for adjustment to changing economic activities: in the past customary law in Lesotho did not make provision for the allocation of land for any business purposes (Sheddick 1954, p.11), now, a number of sites,especially along the roads, have been declared business sites and a growing number of Basotho were allocated land for the establishmnet of businesses.

The Land Husbandry Act No.22 of 1969 has brought another major change in the allocation system by allowing the Minister of Agriculture to specify the purposes for which land may be utilized and to impose erosion control measures (Palmer & Poulter 1972, p.262,. Refer also to vol XV of The Laws of Lesotho, 1970, The Liremo Control Order 1970, and the Land Act of 1973).

The Land Regulations of 1974 provided for the establishment of development committees for every rural area under a chief. The duties of these development committees, included, inter alia, the inspection of lands and hearing of cases relating to revocation or derogation of grants of land.

These changes signify the fact that the Lesotho Government was concerned about the retarding effect of the land tenure system on agricultural productivity. The rate of change was, however, very slow and may not permit a rapid change in land use.

2.13 Land use and management

It has been stated in section 2.12.1 that the traditional object of peasant agriculture in Lesotho has been the production of foodstuffs for direct family consumption. The manner in which the land could be used was greatly influenced by the communal nature of the land tenure (see section 2.12), as well as by the chieftainship system (see section 2.15).

In the study area land use may be classified into three categories, viz., settlements, cultivated land, and rough grazing land.

2.13.1 Settlements

Most of the settlements were the traditional villages that were sparsely distributed, averaging about 45 households in size in the lowland zone and 40 households in the foothill zone. The sizes of the villages ranged from three households to about 160 households, (i.e. from 14 to about 700 people). There were 153 listed villages in the study area, 68 in the lowland and 85 in the foothill zone. Traditionally the villages were situated on the steeper and more rugged slopes, allowing the more level areas to be used for cultivation. They also occupied the edges of the plateau tops and the residual terraces on the hill sides.

With the establishment of agricultural service centres, schools, hospitals, shops, etc., some settlements have come to occupy what was previously arable land and have thereby reduced its area.

Plate 1.

A typical traditional village in Lesotho.

The village is situated on a hill slope near a spring (x).

(Photographed by the author in 1976; printed by Paul Fox).

2.13.2 Cultivated land

(1) Distribution of arable land in Lesotho

Owing to the mountainous nature of the country, only about a million acres, i.e. about 15 per cent of its entire area, came under the plough (Lesotho Govt. (a), 1970). About 73 per cent of the cultivated land was in the lowland and foothill zones (see Table 4.6). Table 2.3 shows that the area actually cropped has been increasing since 1950.

Table 2.3 Cultivated land in Lesotho - 1950, 1960 & 1970 - (ha)

Use	1950	1960	1970
Fallow	83684	30435	38397
Cropped at least once	292834	322474	329938

Source: Agricultural Censa 1950, 1960 & 1970.

The increase in the total arable hectarage covaries positively with the total number of fields. On the other hand the average size of holding decreased from 2.5 ha in 1950 to 2.0 ha in 1970 (Table 4.9). During the same period the average field size had dropped from about 1.0 ha to 0.8 ha. This was because there has been a far greater increase in the number of landholders over and above the increase in hectarage of arable land (see Table 2.4). There was thus a problem of land shortage in Lesotho. This problem was highlighted by the fact that the number of landless rural households was increasing. In 1960 there were 14,780 rural households without land and in 1970 the figure was 26,919. In terms of percentage of total rural population, the 1960 figure was 8.5 and the 1970 figure 12.7 (Monyake,L.B. 1974, p.64).

In the study area 17.1 per cent of the total rural households had no land (TBRDP (a)).

Table 2.4 Number of holdings by zone

Zone	1950	1960	1970
Lowland	71 120	61 010	72 083
Foothill	27 720	37 440	57 738
Mountain	30 350	47 800	39 585
Orange River Valley	20 610	15 000	18 015
Total	149 800	161 250	187 421

Source: Monyake,L.B. p.63

(2) Fragmentation

Traditionally a farmer in Lesotho was allocated land parcels at different sites. This was done to ensure equity in the distribution of physical conditions influencing crop raising, such as relief, soils and weather hazards. Nowadays fragmentation has resulted mainly from the shortage of land. Some villages did not have sufficient arable land and the villagers were allocated land in the areas of neighbouring villages falling under the same chief as their own.

Whilst in the past fragmentation ensured the villagers some measure of security against crop failure, it could nowadays only be regarded as an obstacle to productivity. The fragmentation of such small land holdings impeded mechanisation and the execution of irrigation and soil conservation works. It was thus retarding to development in agronomy.

(3) Types of crop raised

About 90 per cent of the cultivated land in Lesotho was allocated to grain crops (maize, sorghum, and wheat). Although the number of farmers raising wheat was increasing, maize was up to 1960 the most widely cultivated crop. Fig. 4.1 illustrates the changes in the area allotted to the different crops between 1950 and 1970. It is important to note that maize, to a great extent, and sorghum, to a lesser extent, were staple crops which were raised for subsistence.

(4) Soil conservation

Throughout chapter two reference has been made to soil erosion in Lesotho. The causes of erosion include climate, relief, soils, overgrazing, poor cultivation methods, etc. as explained under these headings.

By the 1930's soil erosion had already assumed threatening proportions in Lesotho, especially in the lowlands. In 1935 a sum of £160,000 was voted for soil conservation by the British Government under the 1929 Colonial Development Act (Corona 1950, p.368). In 1936 large scale operations were carried out in demonstrating methods of conservation, and a soil conservation section of the Department of Agriculture was set up (Corona 1950, p.368). There has ever since been some soil conservation measures undertaken by the authorities in Lesotho as evidenced by the different colonial reports. In the development plan of 1960-1964 about 41 per cent of the budget was devoted to soil conservation (Basutoland Govt. 1960). The Laws of Lerotholi and subsequent

legislation also contain a number of clauses governing the prevention of soil erosion.

The measures adopted in soil conservation comprised the laying out of contoured terraces and the introduction of ploughing along the contours, the construction of earth-dams to check gully erosion, and the planting of grass and trees to stabilize contour banks and assist the silting of gullies (Corona 1950, p.368). It was evident from the air photos that contouring was still practised almost without exception where the slopes were inclined.

Despite all efforts to implement soil conservation measures, the problem of soil erosion was far from being solved and it was still regarded as the greatest single problem in agriculture (Lesotho Govt.(a), 1970). Gully erosion was causing considerable loss of land and, according to some writers, yields have progressively declined as a result of sheet erosion. It was estimated that the quantity of soil in arable lands eroded each year was about 0.2 per cent of the total (Lesotho Govt.1976, p.72). This was further evidenced by considerable silting of the dams in the study area.

In some parts of the study area the Thaba Bosiu Rural Development Project has introduced grass waterways and gabion construction as new methods of conservation. A report by the Thaba Bosiu Rural Development Project claims, however, that no area could be said to be adequately conserved because of overgrazing and livestock movements (TBRDP (b), p.4).

(5) Mechanisation

Out of a total of 187,421 farm households in Lesotho, only 456 owned tractors and 18,423 owned draught animals (Lesotho Govt. 1972). During ploughing many households depended mainly on hired services of tractors or draught animals. A few managed to borrow draught animals from friends and relatives. In the study area only five per cent of the fields were ploughed by tractors, the rest being ploughed by oxen(TBRDP (a) p.2).

According to the 1970 agricultural census only 1,929 farmers in Lesotho owned cultivators, the most popular tool in cultivation being the hand hoe. During sowing only 5,761 farmers used the planter with fertilizer and 1,239 used it without fertilizer. In the study area 45 per cent of the summer crop was planted by planter.

Apart from the fact that most farmers could not afford to buy or hire tractors, some areas in Lesotho were just not accessible by wheeled tools because of the ruggedness. In such areas it was difficult to increase production in crops.

Associated with the villages were numerous footpaths and gravel roads on which gullies frequently developed and sooner or later affected the cultivated land.

2.13.3 Rough grazing land

As stated in section 2.6.1 the rights to all grazing land

were held communally. When the fields were under cultivation, grazing was restricted to areas that were not used for cultivation. In the lowlands these areas comprised the mesas and plateaux as well as "maboella" (special areas of protected grazing land). After the harvest of the summer crops the arable land was also opened to communal grazing.

Table 2.5 Numbers of livestock in Lesotho (in thousands)

Year	Cattle	Sheep	Goats	Horses	Donkeys	Mules
1950	401	1 564	637	103	59	3
1960	546	1 466	672	135	97	7
1970	555	1 655	974	110	90	4

Source: Monyake,L.B. p.65

N.B. Pigs,which in 1970 numbered 66,026, are not included in the table.

Almost 70 per cent of the population in Lesotho were owners of livestock (Lesotho (a) 1970). Table 2.5 shows livestock figures in Lesotho for the years 1950, 1960 and 1970. It can be seen from this table that the number of sheep exceeded that of other livestock. Goats were second in number. It was important to note that this group of livestock has low grazing habits and they contribute to the depletion of vegetation. Goats can browse in very difficult areas such as cliffs and dongas.

In the Thaba Bosiu Rural Development Project area as a whole, 44 per cent of the households had cattle, 21 per cent had sheep and 26 per cent had goats in 1970. The average number of livestock per owner household was 4.4, 13 and 8.7 respectively (TBRDP (a),p.2).

Individuals were not subjected to any restrictions with respect to numbers of livestock on communal land - a factor which had contributed to over stocking, deterioration of pastures and erosion (TBRDP (a),p.3).

2.14 Population

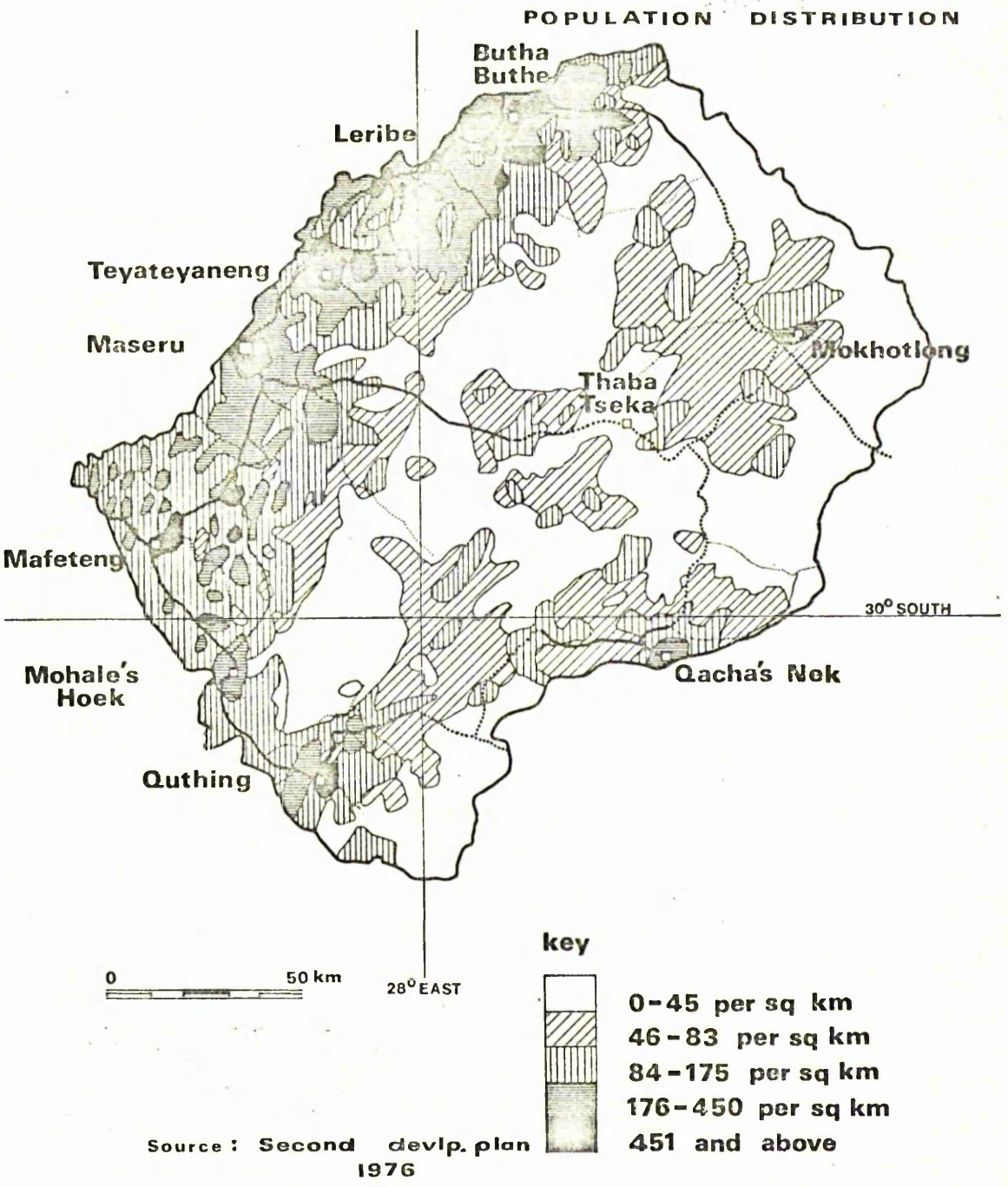
2.14.1 Residential status

It is important to note that the population of Lesotho can be divided into two, viz., the de facto population (i.e.people present in the territory at the time of census), and the absentees (i.e. people who, at the time of census, had been absent for five years or less). Absenteeism, which was reported as early as 1859, was now an accepted feature of life in Lesotho. Most of the absentees worked in commerce and industries (especially mining industries) in the neighbouring Republic of South Africa as unskilled migrant labourers. At the time of the 1956 census absentees constituted about 19.4 per cent of the total population, and during the 1966 census 11.9 per cent. In 1966, 83.2 per cent of the absentees were male, about 88 per cent of these male absentees were aged between 15 and 49 years. It could be inferred from these figures that absenteeism deprived Lesotho of a considerable number of active and able bodied members of the population, particularly because their earnings in the mines and industries of the Republic of South Africa were so low that they could hardly have savings.

2.14.2 Population distribution

In 1966 the de facto population of Lesotho was estimated at 850,000 (Lesotho Govt. (c),1969). About 87.4 per cent of this population was largely dependent on agriculture. The population of the study area in 1974 was 29,531, which was about 2.5 per cent of Lesotho's total population.

Lesotho Fig. 2.11



Source : Second devlp. plan 1976

Being largely dependent on agriculture, and in particular crop raising, about 75 per cent of the population of Lesotho was concentrated in the more level lowland and foothill zones (Lesotho govt.(a), 1970) i.e. 75 per cent of the population concentrated in about 30 per cent of the land area. As will be demonstrated in chapter five the result was high crude population densities, averaging 70 per km^2 in the western lowland areas and low densities, averaging 14 per km^2 in the mountainous areas (Fig. 2.11). The estimated densities on arable land, however, give an opposite picture (Table 2.6). Since the population in the mountains was also dependent on livestock farming, the high density figures in these areas did not necessarily reflect a higher pressure of population.

Table 2.6 Estimated population densities (people/km^2) on cultivated land by zone

Zone	1966		1971		1976	
	De jure	De facto	De jure	De facto	De jure	De facto
Lesotho	251	221	280	246	313	275
Lowland	200	176	223	196	249	219
Foothill	292	256	326	286	363	320
Mountain	315	277	351	309	392	345
Orange River Valley	299	263	334	294	373	328

Source: Monyake, A.M. 1973 p. 92

2.14.3 Population growth

The increase of the de jure population from the 1956 figure of 793,639 persons to 969,634 in 1966 was 175,995 persons. This gives a net yearly growth rate of approximately 2.02 per cent compound (the prevailing growth rate is officially regarded as 2.2 per cent).

As there was negligible international alien migration into Lesotho, this increase may be attributed exclusively to natural growth, i.e. excess of births over deaths. Fig. 5.1 illustrates the growth trend of the population of Lesotho between the years 1891 to 1976.

2.14.4. Occupation

There were few job opportunities in Lesotho and only about 15 per cent of the working age population found employment inside the country. It has already been mentioned that about 12 per cent of the population was in 1966 outside Lesotho mainly for work purposes. About 40 per cent of the working age population were under-employed, mainly in agriculture, and about 14 per cent were unemployed (Lesotho govt. (c) 1969).

Among the farming households about 12.9 per cent were engaged in some side line jobs (i.e. income yielding work other than own farming activities including, inter alia, home handicraft) and regarded farming as a secondary occupation. About 50.7 per cent did have side line jobs but their main occupation was still farming. The rest were solely dependent on farming for their livelihood (Lesotho govt. 1972).

A few households were classed as rural but they did not have arable land holdings. Table 2.7 gives the percentage of these households by zones. There were more landless households in the lowlands than elsewhere, as will be demonstrated in chapter five. This was so because there were higher population densities in the lowlands, and also because of the proximity to places of employment which provided alternative means of subsistence for the landless households.

Table 2.7 Percentage households with and without land by zone (1960 & 1970)

Zone	1960		1970	
	with	without	with	without
Lowland	89.4	10.6	84.1	15.9
Foothill	91.3	8.7	89.6	10.4
Mountain	93.8	6.2	90.9	9.1
Orange River Valley	92.7	7.3	86.0	14.0
Lesotho	91.5	8.5	87.3	12.7

Source: Monyake, L.B. p.64

One notable feature characterizing Basotho farmers in a unique way was the co-operation that existed in the execution of farming activities. Whenever a farmer experienced some difficulty in carrying out one or the other farming activity (weeding, harvesting, etc.), he could call for help from his neighbours in a traditional manner called letsema.

Associated with this traditional practice was the share-cropping system, whereby a landholder could contract with a partner who provided the necessary span of oxen, seed, labour, etc., and the two worked together on the land and shared the produce. The sharing of crops was also practised by farmers who acquired temporary rights to the use of land which belonged to others. According to the 1970 agricultural census about 12.93 per cent of the farming households practised share-cropping.

2.15 Administration

The 1966 Independence Order of Lesotho states that the legislature comprised the King, who was constitutional head of state, the Senate and a National Assembly. The Senate comprised 22 principal chiefs or their nominees and 11 other persons nominated by the King. The National Assembly consisted of 60 members elected from single-member constituencies. Ever since the abandonment of the elections and the suspension of the constitution following the 1970 incidences, the position of the legislature was uncertain.

The country was divided into nine administrative districts, each one under a district administrator who was responsible to the central government. The central government offices, as well as the offices of the Maseru district, were in Maseru the Capital. The everyday problems of the villagers were handled through a system of chieftainship. The hierarchy of this system is illustrated in Table 2.8

Table 2.8 Hierarchy of the Chieftainship

Area of responsibility	Title	No. of Officers
Nation	King *	1
Ward	Principal (senior) chiefs	22
Village area (group)	Ordinary chiefs & senior headmen	1,200 (approx.)
Village	Village head	5,000 (approx.)

Source: Wallman 1969, p.16

* According to the Chieftainship Act No.22 of 1968 the term chief does not include the King.

It is important to note that the chiefs had a great influence over the villagers, and the co-operation of the chiefs was one of the pre-requisites to the successful implementation of any project in the villages.

2.16 Summary

Lesotho's production was almost entirely confined to an agricultural economy. About 85 per cent of the population was dependent on agriculture, mainly on the raising of crops, yet about 75 per cent of the territory was unsuitable for crop raising because of ruggedness. As a result about two thirds of the population was concentrated on the more level lowland and foothill zone which together constitute only about 25 per cent of the territory. The study area is situated partly in the lowland and partly in the foothill zones.

Rainfall is very erratic and, because dry land farming was the norm in Lesotho, it was a major physical cause of crop failure. Apart from the lack of irrigation facilities, the methods used in raising crops were generally poor resulting in low yields. Hence, production was mainly at a subsistence level.

Being bare and rugged with friable soils, the territory is highly susceptible to erosion. This is more so because the rain comes in heavy thunder showers that are highly erosive. Soil erosion was further accelerated by poor management of agricultural resources. Although the colonial administration is reported to have spent much of its revenue on soil conservation, the situation has been deteriorating partly because the conservation methods used were inadequate and partly because the conservation works were not properly maintained.

Gross domestic product was low with the result that the general standard of living, especially among the rural households,

was very low. The contribution made by the secondary sector to GDP was remarkably small and it reflected the general lack of paid employment in the territory. About ten per cent of the population was employed in the industries of neighbouring South Africa, resulting in the chronic situation of landholders being absent from their agricultural holdings.

Economic under development in Lesotho resulted from a number of factors, chief of which were :

(a) lack of mineral and agricultural resources

(b) its geographical position as an enclave in a racist country

(c) almost a century of neglect by the colonial administration and (d) failure of traditional practices to make swift adjustments to the monetary economy that arose in the neighbouring South Africa with the discovery of minerals.

Chapters four and five will give an analysis of the use of agricultural resources in Lesotho. The next chapter explains the methods used in collecting and analysing the data for the study.

CHAPTER 3

METHODOLOGY

The study was carried out by airphoto interpretation, field checking, field surveying, field observation and measurement, together with a questionnaire survey (structured interviews), and discussions with government officials and the various experts working in Lesotho. It was supplemented by the available literature, maps, and statistical data.

The procedure in carrying out the study may be divided into two phases, viz.,

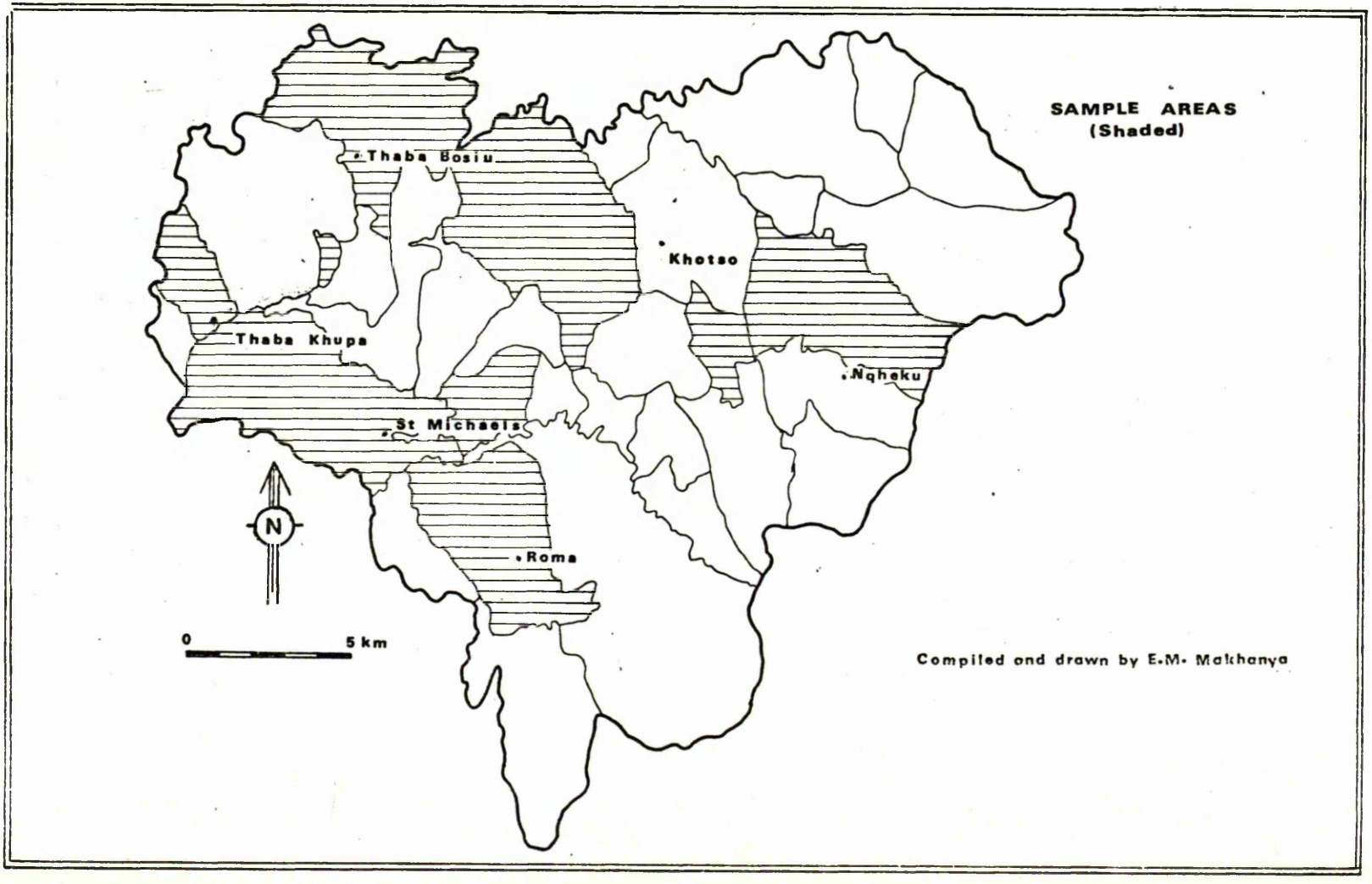
(a) a generalized study of land use, erosion and the related socio-economic factors for the entire area and

(b) a more detailed study of the same phenomena in eight selected areas, involving some 57 villages or 42 per cent of all the villages, and a population of about 12,291 or 41 per cent of the total population of the study area.

Two of the eight selected areas were chosen arbitrarily, namely, first the area of Mafefoane because it was now zoned an urban area, and secondly the area of Ratau because it was the only area where soil conservation work had already been introduced by the Thaba Bosiu Rural Development Project when the study was undertaken. The other six areas were chosen by a stratified random sampling (see Fig.3.1). An explanation of the various methodologies used in the study is given under sections 3.1 to 3.6.

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 3.1



3.1 Airphoto interpretation

Airphoto interpretation, which forms the basis of the study, preceded all field work. The main air photographs used were taken in April - May 1950/ March 1952, April 1961, August 1971 and April 1975 at approximate scales of 1:30,000, 1:30,000, 1:40,000, and 1:80,000 respectively. Other photographs were available, but were used only for comparison because they did not cover the whole area; these were the Roma photographs of 1968 (scale 1:10,000) and 1974 (scale 1:20,000).

3.1.1 Characteristics of the photographs

The film used for all the above photographs was panchromatic, and the prints used were approximately 23 x 23 cm. As explained under section 3.1.2 the scales 1:30,000 and 1:40,000 were adequate for the purpose of the study. The scale of 1:80,000 of the 1975 photographs made it difficult to identify some of the features, namely erosion features and individual homesteads; but because the photography was recent, it proved to be very useful in the field. At scales 1:10,000 and 1:20,000 it would have been possible to map the individual fields, and at scale 1:10,000 it would have been possible even to identify the individual crops. These applications have, however, not been pursued because of the limited areal coverage of the photographs, and because crop and field patterns were not central factors with respect to the study.

The 1971 photographs used were contact prints and had rather poor contrast. Contrast in all other photographs was generally

good. Section 3.1.2 gives a description and classification of the various mapping units used in the different sets of photographs.

3.1.2 Description and classification of the mapping units

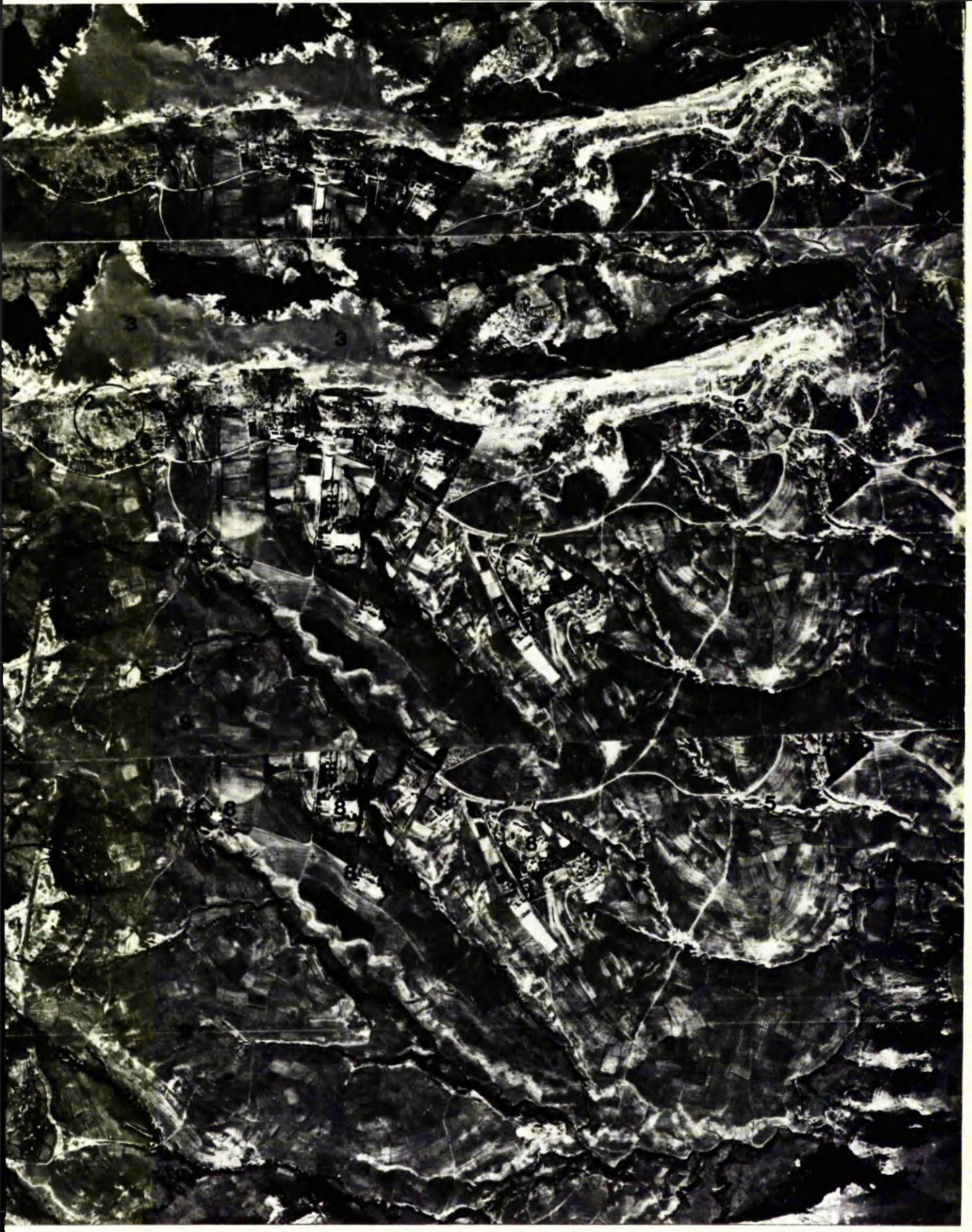
3.1.2.1 Land use mapping

As it was stated in section 2.7 land use in the study area may be classified into settlements, cultivated land, and rough grazing land (see Fig.3.2). Since the airphoto interpretation (API) elements used in mapping the three land use categories were utilized with varying degrees of usefulness in each case, it is desirable to describe the mapping of each land use category separately.

(1) Settlements

Since the traditional settlements were in clusters it was quite easy to identify them on the airphotos. After identifying the villages, the individual homesteads were counted. At the scale 1:30,000 this was done with relative ease. At the scale 1:40,000 the individual homesteads could still be identified, except for the fact that some of them were camouflaged by poor contrast of the photo prints, but with the aid of an intepretoscope the task of identifying the homesteads at this scale was made relatively easy. Identification of the individual homesteads at the scale of 1:80,000 was done with great difficulty.

Apart from the traditional settlements, there were mission and other buildings which were much easier to identify on the airphotographs at all scales (see Fig.3.2).



Constructed by E.M. Makhanya

Fig. 3.2

A STEREO-TRIPLET OF THE AREA OF MAFEFOANE

1. DYKE 2. ROCK SCREE 3. QHOBOSHEANENG MESA 4. SCARP
5. GULLY 6. VILLAGE 7. RUINS 8. INSTITUTION BUILDINGS
9. CULTIVATED LAND

1961—SCALE 1: 30000

The following API elements were used in mapping homesteads.

Table 3.1 API elements in mapping homesteads

Photography	API elements				
	Greytone	Stereo effect	Pattern	Texture	Converging evidence
1950 / 52	X	XX	XX		XX
1961	X	XX	XX		XX
1971		X	XX		XX
1975	XX	X	XX		XX

X useful

XX very useful

(2) Cultivated land

Distinguishing cultivated land from non-cultivated land was done with relative ease at all scales (see Fig.3.2). The following API elements were used:

Table 3.2 API elements in mapping cultivated land

Photography	API elements				
	Greytone	Stereo effect	Pattern	Texture	Converging evidence
1950 /52	XX		XX		X
1961	XX		XX		X
1971	X		XX		X
1975	XX		XX		X

3.1.2.2 Soil erosion mapping

As a result of the unfavourable climatic conditions and the ruggedness of the land, there was hardly any area in the study area that was not subjected to some kind of erosion. The area was thus

divided according to the intensity of erosion into two, namely, areas that were subjected to slight or moderate erosion and those that were subjected to severe erosion. A further division was made according to the dominant erosion process, viz., sheet and gully. An area of 1 ha (6.25 mm^2 on the photographs at scale 1:40,000 and 11.11 mm^2 at scale 1:30,000) was used as a unit to determine the dominant process and class of erosion. Where no gullies were present within this area, and also where the gullies were shallow (i.e. without stereo-effect) the erosion was regarded as sheet. As far as the gullies were concerned the classes of erosion were determined according to the number and depth of the gullies as shown in Table 3.3.

Table 3.3 Erosion classes according to number of gullies and gully depth.

Depth*	No.	Class
Deep	1	moderate
	2	severe
	3+	very severe
Very deep	1	severe
	>1	very severe

* The classification of gullies according to depth is as follows: shallow = 1 metre, deep = 1 - 5 metres, and very deep = 5 metre +

In some areas it was difficult to determine the dominant type of erosion, since there were evident signs of both sheet and gully types. These areas were grouped under the mixed sheet and gully type. The following API elements were useful in the erosion survey:

Table 3.4 API elements used for erosion survey

Process	API elements				
	Greytone	Stereo effect	Pattern	Texture	Converging evidence
Gully	XX	XX	X		XX
Sheet	XX	XX	XX		XX

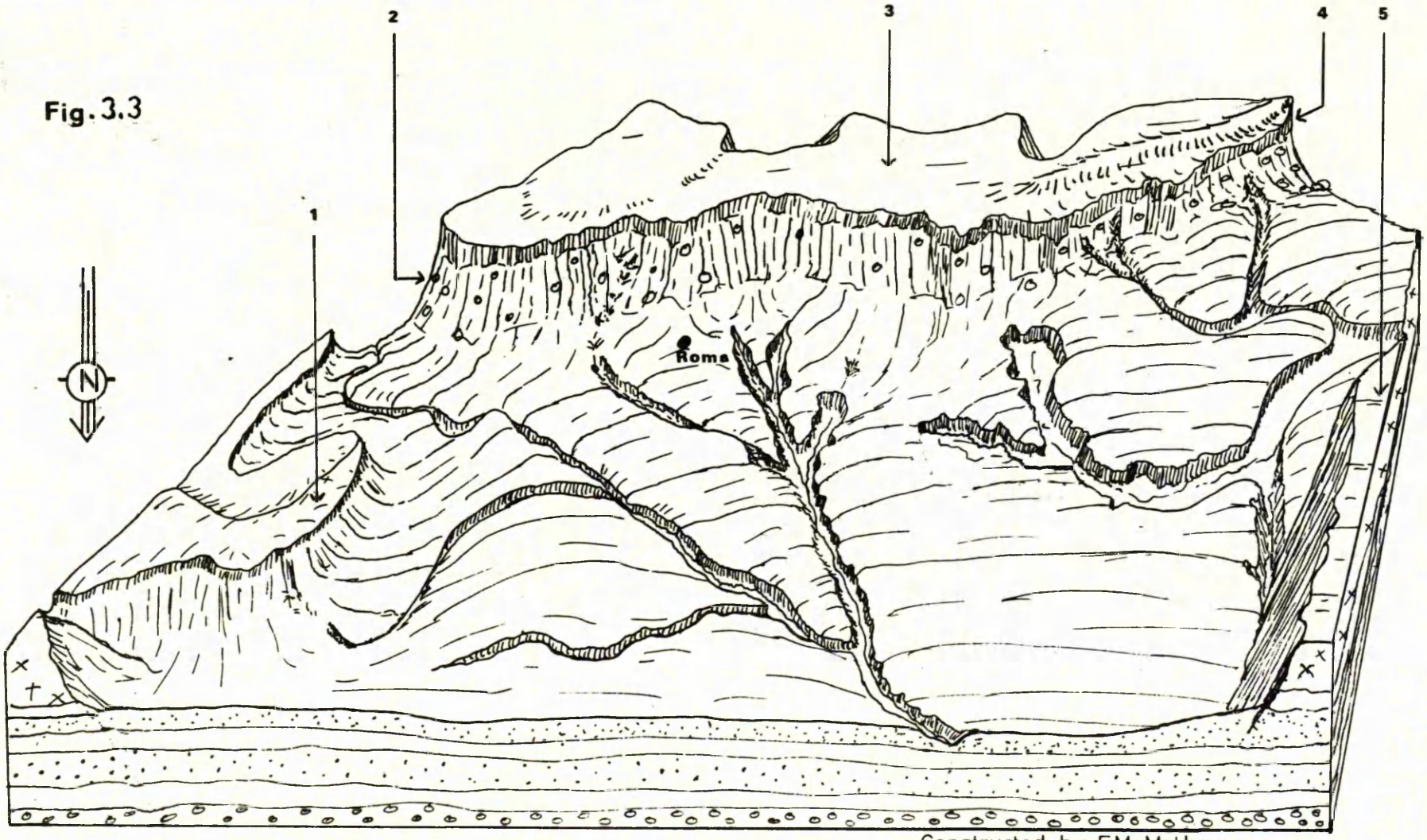
(1) The production of the soil erosion maps

In the case of the sample areas the production of the erosion maps followed a series of mapping stages: At first an average slope map was drawn from the 1:10,000 orthophoto maps by using the Raisz and Henry method (Monkhouse and Wilkinson 1956 pp.102-106). The orthophoto maps were themselves produced by Hunting Surveys in 1974 from the 1971 air photographs. It was found that this method of drawing average slope maps was quicker and more precise in quantification than the use of air photographs (see Fig.3.4 for example). From the 1961 air photographs the slopes were classified in a separate map according to whether they were convex or concave. By superimposing the former map on the latter, and taking into account the length of the slopes and vegetation cover, an erosion susceptibility map was drawn. By further superimposing the erosion susceptibility map on mapped erosion features an erosion map was produced (e.g. Fig.3.6).

(2) The production of the erosion hazard maps

The erosion hazard maps (e.g. Fig.3.7) were produced by simply superimposing the land use and conservation maps on the erosion maps, and then mapping areas where severe erosion overlapped with cultivated land.

Fig. 3.3



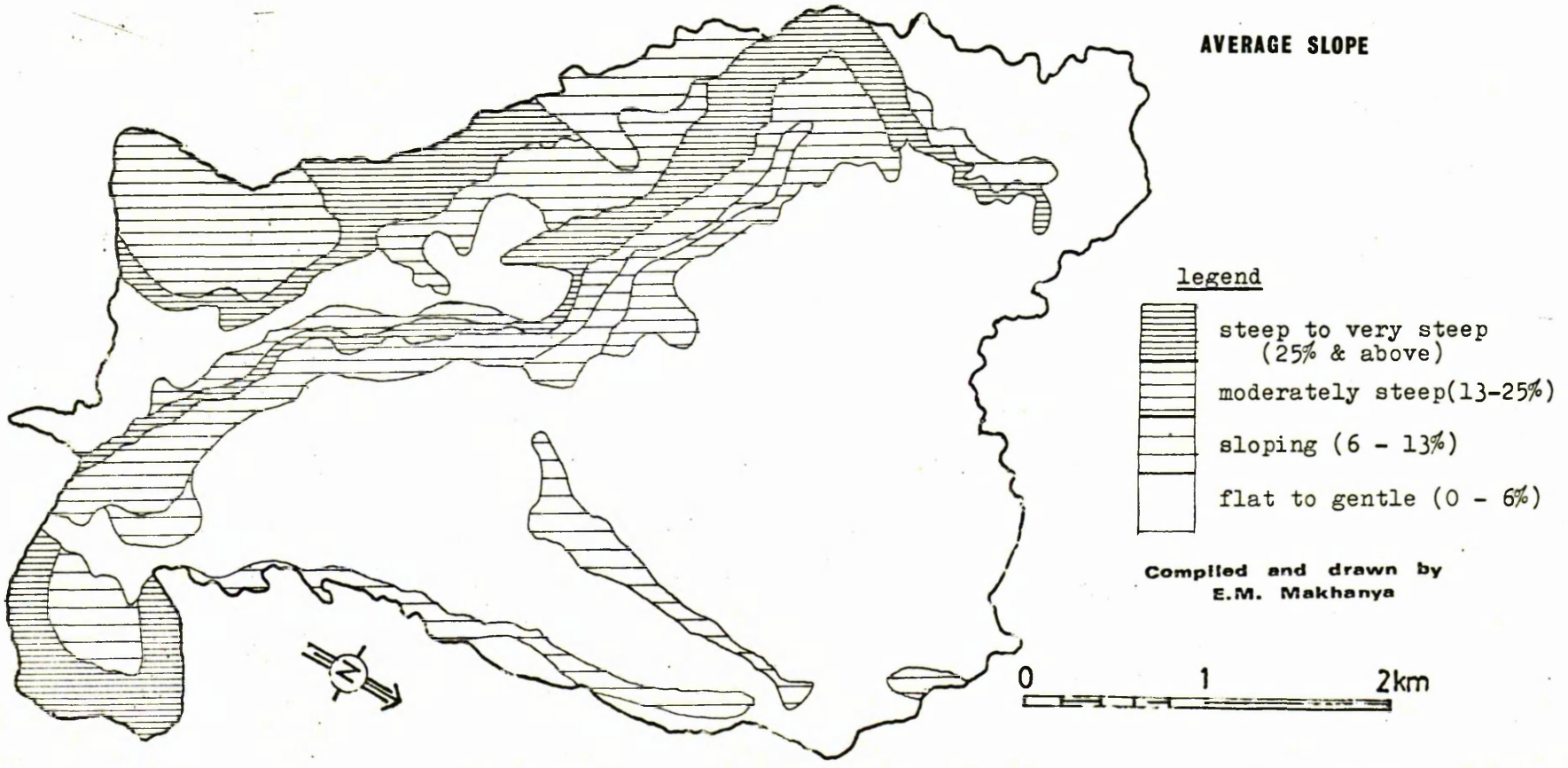
Constructed by EM Makhanya

A one-point perspective block diagram of the area of Mafefoane.

1. Dyke 2. Rock scree 3. Qobosheaneng mesa 4. Scarp 5. Scarp marking boundary between lowland and foothill zones.

The area of Mafefoane

Fig. 3.4



The area of Mafefoane

Fig. 3.5

DRAINAGE

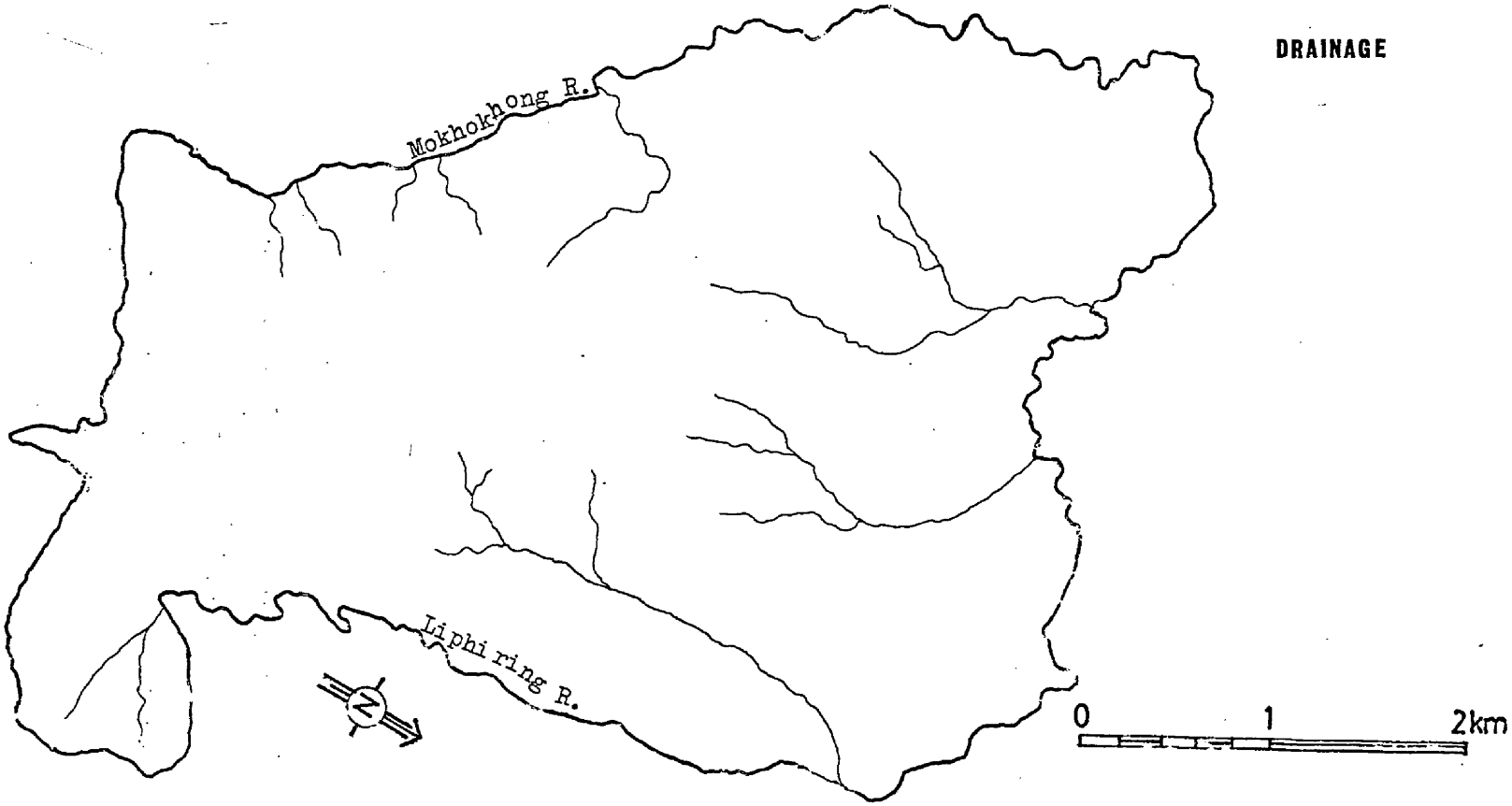
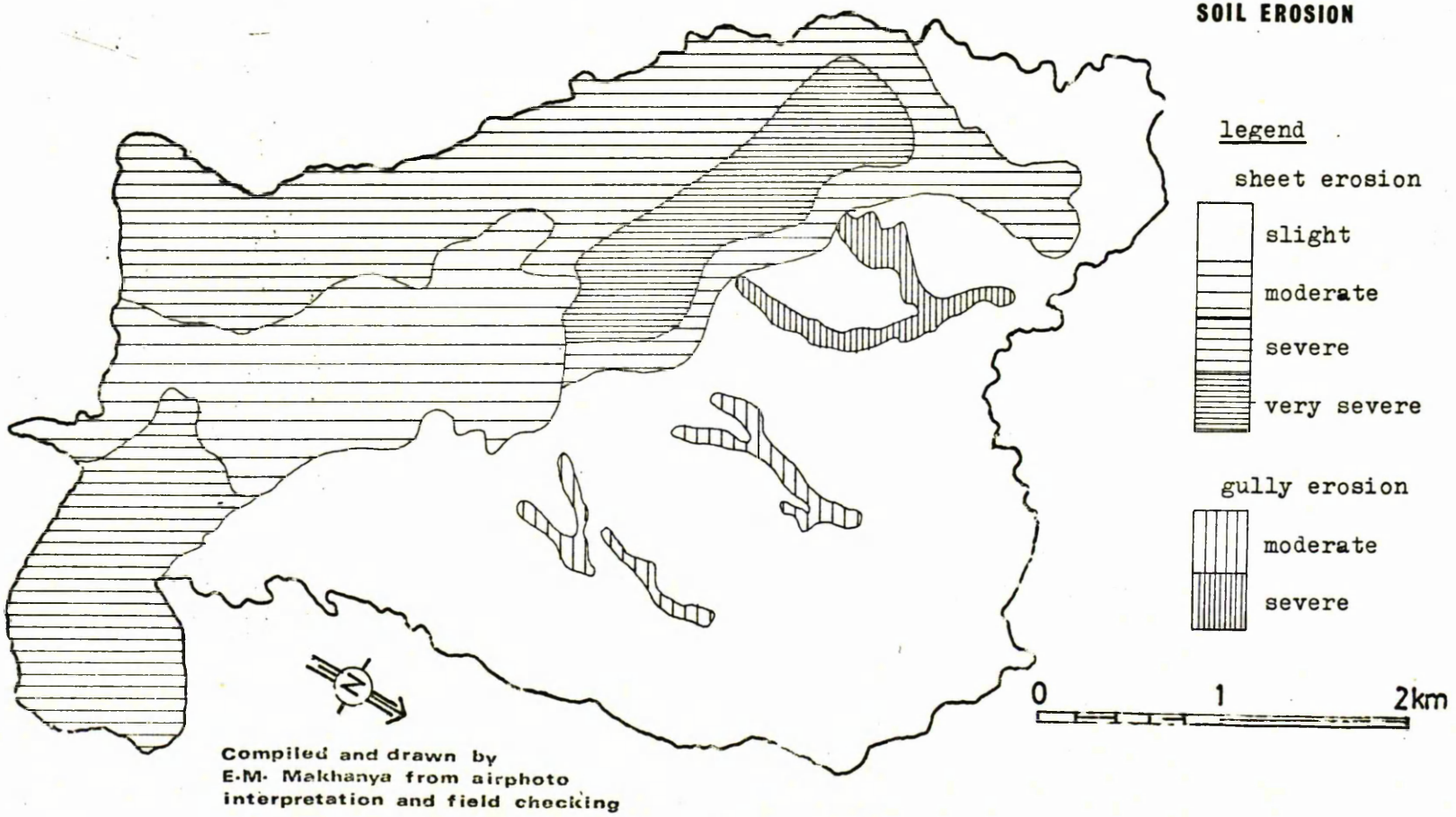


Fig. 3.6

The area of Mafefoane



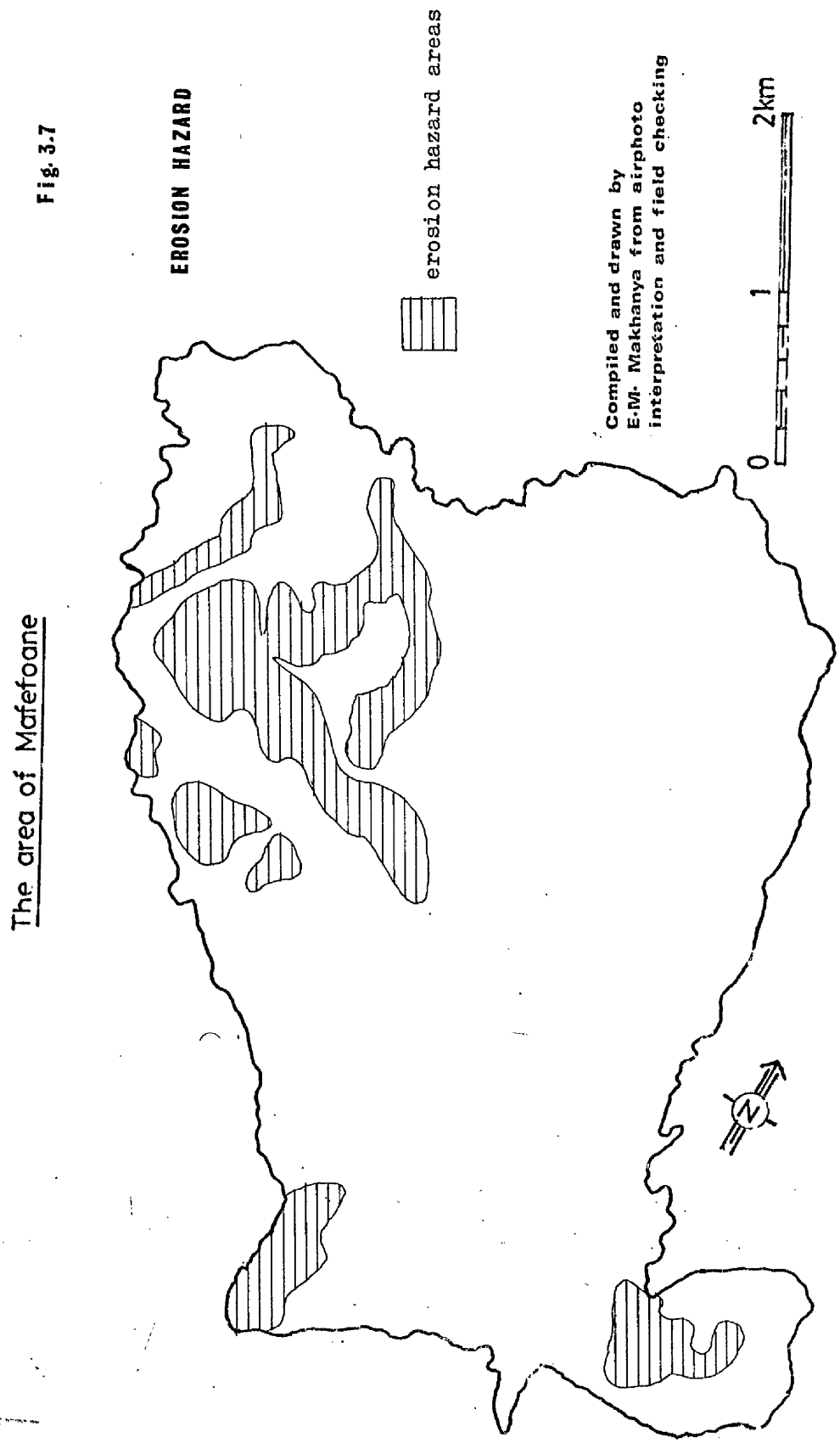


Fig. 3.7

The area of Mafefoane

3.1.3 Base map compilation

The base maps used were in all cases compiled from the 1:50,000 topographic sheets produced by DOS (1955). In order to facilitate the transfer of interpreted data from the photographs on to the maps, the scale of the base maps was either enlarged or reduced to that of the photographs by means of a precision pantograph. In the case of maps involving many photographs, the transference of interpreted data was done by means of an optical pantograph; in the case of maps involving one or two photographs and where there was no marked effect of relief displacement, the data were transferred directly on to the maps.

3.1.4 Measurements

Measurement of data derived from airphotographs was taken wherever possible by means of a planimeter and cross-checked by systematic dot sampling. In cases where the areas were too irregular to be measured by a planimeter, only the counting of dots was used. An analysis of the results obtained by the two methods showed a correlation coefficient of 0.99882 at the 0.00001 level of significance (Fig.3.8). The scale of the dot grid used was 4 dots = 1 cm^2, and by using the formula

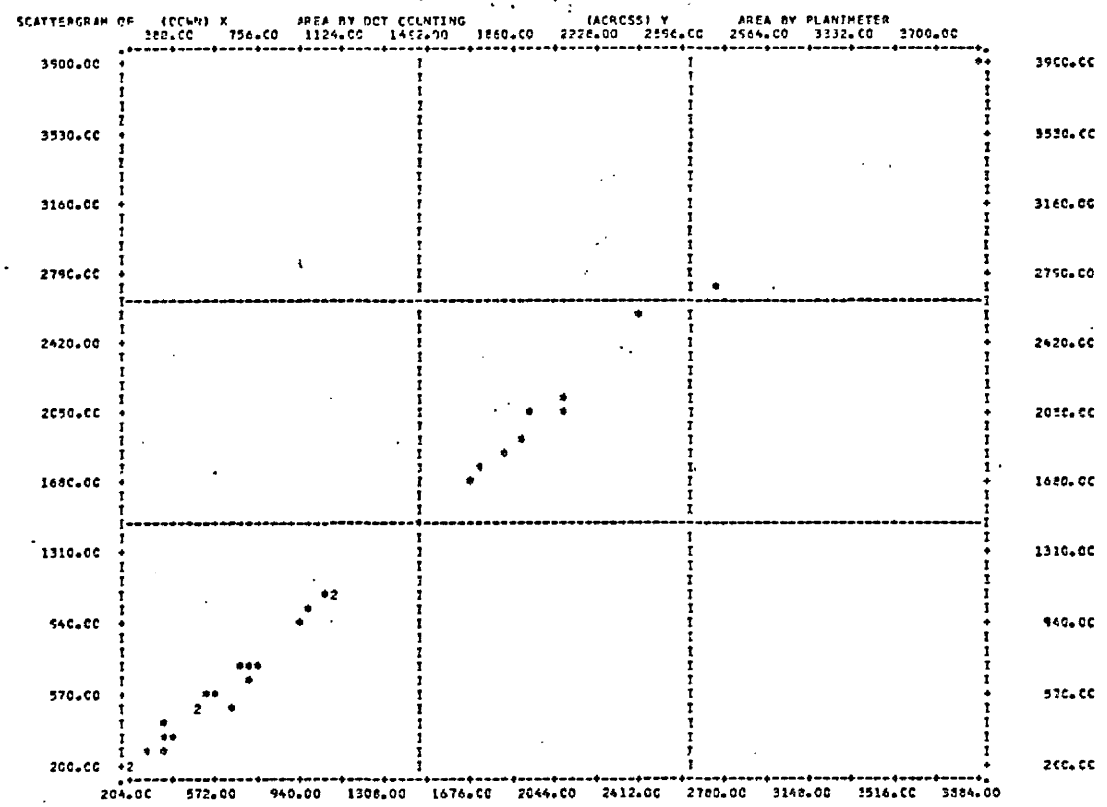
$$S.E. = \sqrt{\frac{(100 - P)}{P.N}} \quad X\ 38,400$$

where S.E. = allowable sampling error
P = percentage of stratum to the whole area
N = total number of dots

the sampling error calculated for the land use maps of the entire

FIG. 3.8

Scatter diagram of measurement results obtained by planimeter and dot sampling. -



STATISTICS..

CORRELATION (R)-	0.99882	R SQUARED -	0.99765	SIGNIFICANCE -	0.00001
STD ERR OF EST -	43.58593	INTERCEPT (A) -	-15.78803	SLOPE (B) -	1.01861
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

********** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

area was as follows:

Table 3.5 Sampling error in dot sampling for land use maps

Scale	Cultivated land			Rough grazing land		
	Area(ha)	Sampling error		Area(ha)	Sampling error	
		%	ha		%	ha
1:40,000	19,550	3.3	± 645	16,300	3.5	± 570
1:30,000	18,706	2.2	± 412	17,230	2.2	± 379

3.2 Field checking

Fieldwork was undertaken after airphoto interpretation for the purpose of checking the accuracy of the mapping units. There were two stages of field checking, at different levels of intensity. At first field checking was done over the whole area i.e. checking for the mapping units of Figs. 4.15, 4.23, 4.28 and 5.5. This was followed by a more intensive check in the sample areas. The photographs used in the field were the most recent ones i.e. the 1971 and 1975 photographs.

3.2.1 Field checking for land use

The boundary line between cultivated and non-cultivated (grazing) land was quite obvious during photo interpretation. It was therefore an easy task to check the accuracy of the mapping of this boundary, and the level of accuracy was estimated at 98 to 100 per cent.

Checking for the settlements was done for two purposes, viz., (a) checking for the location of the settlement and (b) checking for the number of estimated households. In checking for their location, it was found that only three villages or 2.2 per cent of the total number of villages were missed during the photo interpretation. Two of these missed villages were established after the 1971 photography. Five of the mapped villages proved to be ruins - the distribution of all ruins in the study area is shown in Fig. 4.22.

The counting of the households in the field to check the

accuracy of photo-interpretation was quite a strenuous task in terms of time and money. The exercise could thus not be carried out for the whole area. Only 15 villages were chosen for it, on the basis of their being situated near some vantage point from which a quick count could be made.

The figures obtained together with figures derived from the photographs were compared with those of the 1969 prelisting and the 1976 population census (see Table 3.6). However, in seven

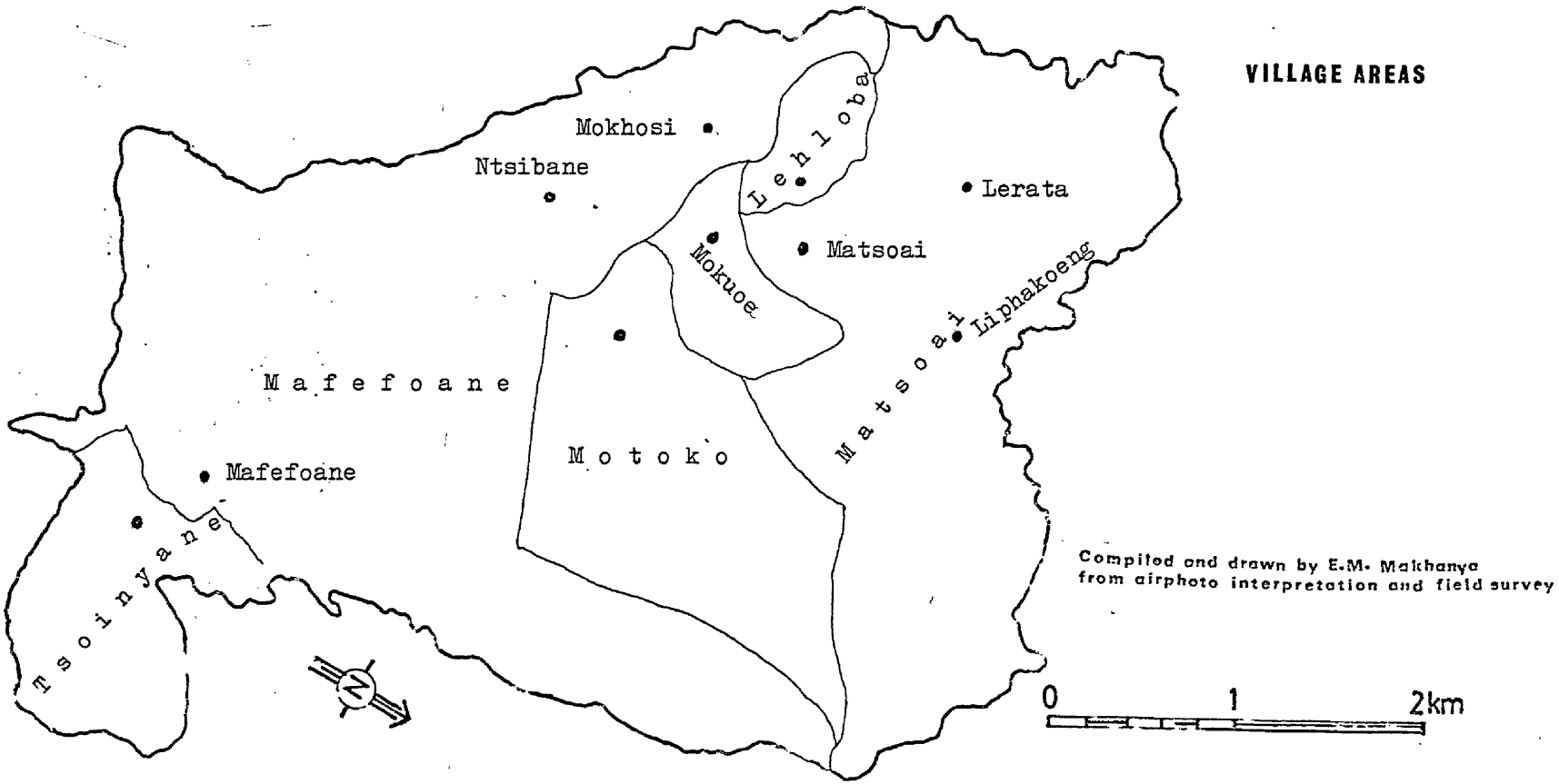
Table 3.6 A comparison of the results obtained by the various household (HH) counts in selected villages

Village	1969 pre-listing		1971 photo counts		1975 photo counts		1976 census		1976 field counts	
	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
Mahaheng	20	6	22	6	26	6	27	5	27	6
Makhalanyane	44	3	57	3	65	3	72	2	67	2
Mokhosi	7	8	7	8	7	8	6	8	7	8
Ntsibane	13	7	13	7	13	7	12	7	13	7
Phaloane	43	4	59	2	67	2	22	6	63	3
Sekete	106	1	98	1	114	1	99	1	103	1
Thaba Khupa	50	2	55	4	64	4	68	3	59	4
Tjopa	39	5	43	5	45	5	44	4	44	5
Rank correlation			0.95		0.76				0.86	
significance level (one-tailed test)			0.01		0.05				0.01	

of the villages (all in the area of Mafefoane) it was not possible to make a good comparison because of the fact that the villages were too close together and the delimitation of the boundaries was apparently not uniform in the various methods of enumeration (cf. Figs 3.9 and 3.10). This difference in boundary

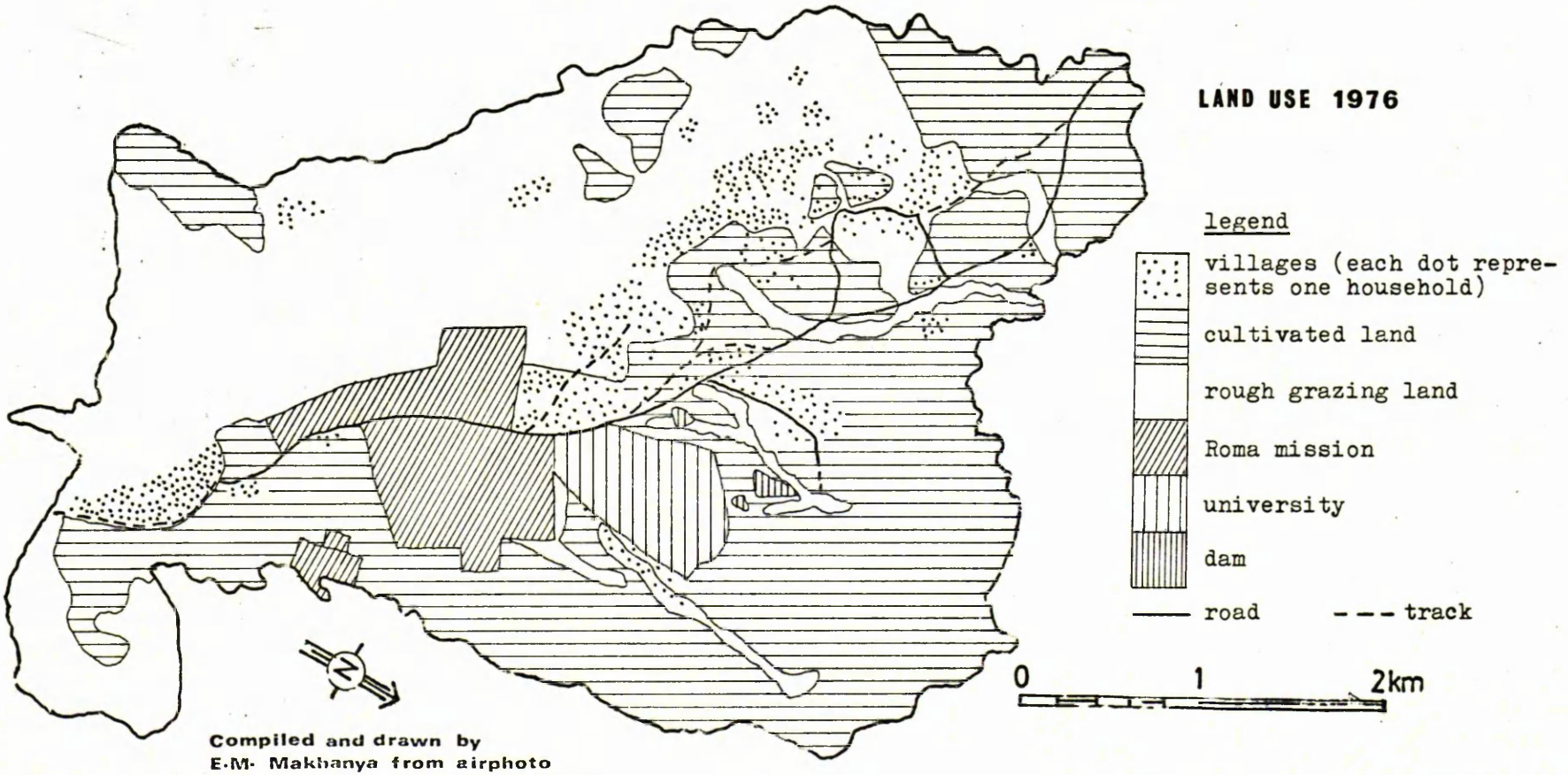
The area of Mafefoane

Fig. 3.9



The area of Mafefoane

Fig. 3.10



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

delimitation in cases where villages were close together was noticed even between any two population censa of Lesotho, even though the same department (Department of Statistics) was responsible for the enumeration. The main reason for this was most probably the fact that different enumerators were employed to do the counting, and their interpretation of the often imprecise village boundaries could obviously not be expected to be consistent throughout.

The checking of the accuracy of household counts by photo-interpretation for the rest of the study area, and for the different sets of photographs was done by comparison with the various population censa. A few shortcomings were experienced in the exercise, viz.,

(a) the fact that the names of some villages were missing from the various censa (see Table 3.7). A more detailed account of the naming of the villages that will explain why this sometimes happened, is given under section 3.3.

(b) the fact that the 1966 population census did not give the number of households and therefore could not be used effectively in the comparisons, and

(c) the fact that the censa were not taken at the same dates as the photographs. This appeared to be the most limiting factor in the comparisons, especially in the case of the 1950/52 and 1961 photography where there were differences of four to six years between the photo coverages and the nearest census. However, since the number of households in most villages did not show a marked increase between 1950 and 1971 (see Table 3.7), the fact that the censa and photographs were not taken at the same time did not seem to have mattered much. The other redeeming

factor here was the fact that the two photo coverages which differed in dates from the census were of the larger scale (1:30,000) in which the households could be identified with relative ease. This was particularly true of the 1950/52 photographs in which identification of the individual households was made even easier by the fact that in most villages there were still very few households.

Whereas the object of the comparison of household counts obtained through the various methods was to check the accuracy of the photo interpretation counting, the results showed that even the other methods of counting households were not without error. For instance, the 1956 census showed Kubutu to have 42 households. This figure did not compare favourably with the results obtained from the other household counts for the village (see Table 3.7). Unless there were changes in the boundaries or a removal of some households in the village after 1956, it could only be concluded that there was an error in enumeration. Similarly, the figures given for Mokhosi and Ntsibane in the 1976 census were incorrect - these villages were among those in which actual counting of the households was done during fieldwork and the results were as shown in Table3.6.

3.2.2 Field checking for erosion

After a general check for erosion mapping for the whole area a more intensive check followed in the sample areas. The field checking here was done after every stage of mapping, viz.,

(a) after drawing the average slope map

(b) after classifying the slopes according to their forms,

Table 3.7 A comparison of the household counts by photo interpretation with those of the various censa for selected villages

Area	1950/52 photo counts		1956 census		1961 photo counts		1969 pre-listing		1971 photo counts		1975 photo counts		1976 census	
	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
Kubutu	22	7.5	42	2	24	10	33	7	33	7.5	35	7.5	N/A	
Lethena	26	6	30	4	36	5	39	4.5	44	4	49	4	52	2
Libe	16	12	25	5	18	12	N/A		16	12	16	12	13	7
Matlangoana	20	9.5	N/A		25	9	20	9	33	7.5	34	8.5	N/A	
Mokhosi	7	15	N/A		7	15	7	13	7	15	7	15	6	10
Molengoane	28	5	33	3	61	2	72	2	83	2	103	2	108	1
Mothae	19	11	N/A		20	11	16	10	23	11	24	11	26	6
Ntsibane	12	14	N/A		13	14	13	11	13	14	13	14	12	8
Ralejoe	36	3	N/A		40	3	48	3	48	3	65	3	N/A	
Ranye	13	13	N/A		14	13	10	12	14	13	15	13	11	9
Sekete	22	7.5	N/A		30	7	24	8	32	9	34	8.5	38	4
Theko	129	1	132	1	141	1	122	1	148	1	159	1	N/A	
Thibakhoali	20	9.5	24	6	26	8	N/A		31	10	32	10	34	5
Tjopa	37	2	N/A		39	4	39	4.5	43	5	43	5	44	3
Tsiki	30	4	N/A		33	6	38	6	42	6	40	6	N/A	
Rank correlation		0.77				0.96				0.98		0.99		
Significance level (one-tailed test)		0.05				0.01				0.01		0.01		

i.e. whether they were concave or convex

(c) After mapping the erosion features

(d) After mapping the erosion hazard areas.

3.3 Field survey

After the first phase of field checking, i.e. field checking for the mapping units of the whole area, it became clear that the object of the study could not be accomplished before a detailed map, showing the villages together with the land allocation boundaries, was available. Without such a map there was not even sufficient information on which sampling could be based. It was therefore decided to undertake a survey of the whole area with a view to mapping details about (a) the names of all the villages and (b) the land allocation areas.

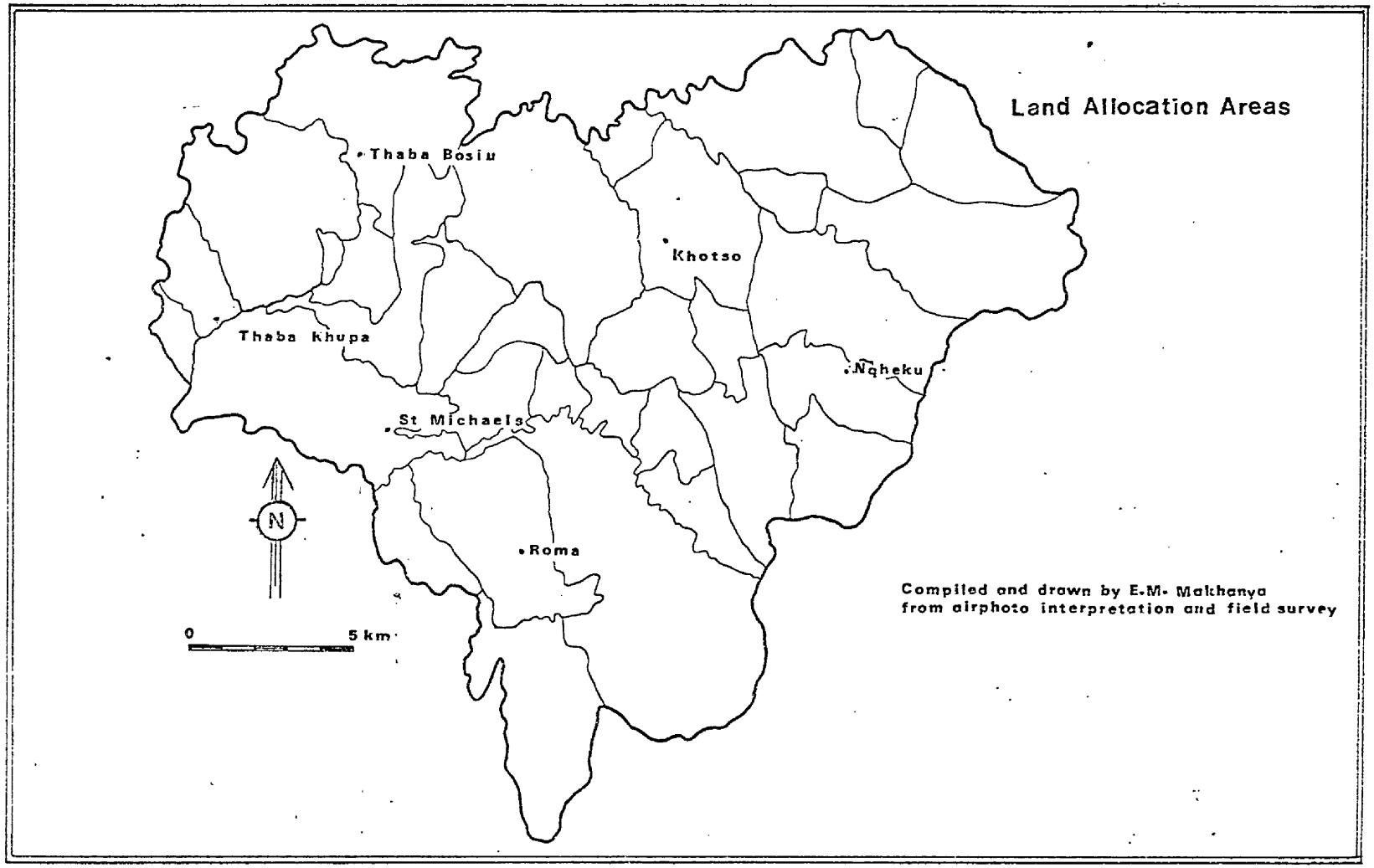
This proved to be one of the major tasks of the study in terms of time and money. It involved going to the various chiefs in the study area, armed with air photographs, maps and a pair of pocket stereoscopes, to collect the required information. Only the chiefs with land allocating powers were sought to provide the information.

As each chief described and pointed out his administrative boundaries, the information was recorded on to the photographs. The same was done to the names of the villages. The recorded information was then transferred on to the map as shown in Figs.1.3 and 3.11. The survey involved much travelling around in order to identify the ground features, delineated on the photographs.

While the land allocation boundaries shown in Figs.1.3 and 3.11 have been carefully compiled on the basis of the information received from the chiefs, there were a few areas where there were

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 3.11



disputes over boundaries. However, the disputes centred mainly around grazing land rather than around cultivated land, and therefore did not seriously affect the results of this study. It was further insisted that the chiefs should describe the boundaries as they were at the time of surveying rather than as they were in the past or as they ought to be. The information given was controlled by the fact that the neighbouring chiefs also gave their description of the same boundaries. Where the difference between the versions of two neighbouring chiefs was big (this happened only once) the opinion of the ward chief was sought.

3.3.1 The names of the villages

One interesting feature encountered in the survey was the confusion which often had to be cleared in arriving at the correct names of the villages. In Lesotho the village names were associated with some object, be it animal, river, man, past event, etc. They are seldom meaningless. Here are a few examples:

(a) villages named after a tribe e.g. Matebeleng

(b) villages named after the family that arrived first e.g. Ha Mokapi, Ha Mochesane, Ha Mokotla. Note that all the names of the families are preceded by the locative Ha which simply means at e.g. Ha Mokotla = at Mokotla's or the area of Mokotla.

(c) villages named after chiefs or headmen e.g. Ha Matsoai, Ha Mothae, Ha Joele, Ha Makafane etc.

(d) villages named after geographical features e.g., Lekhalong (at the pass), Mafikeng (at the rocks), Sekhutlong (at the watershed), etc.

(e) villages named after certain folklore incidents, e.g. Boinyatso (self criticism), Pae-la-itlhatsoa (a blanket washes itself), Thaba Bosiu (mountain by night) etc.

(f) villages named after certain historical events, e.g. Malimong (at the cannibals), Tsoeneng (at the monkeys), Liphakoeng (at the hawks) etc.

(g) villages with descriptive names, e.g. Khubetsoana (reddish).

For the sake of convenience in tabulating, printing and writing out, the locative Ha of the names of villages of categories (b) and (c) above have been omitted in this thesis.

3.3.2 Confusion arising from the system of naming the villages

As a result of the trend of naming the villages described under section 3.3.1, there was often confusion over the names of the villages because of:

(a) the fact that one name was often given to different villages, e.g. Malimong under Maloto as well as under Lebamang; Majoro under Tumahole and Musuoe Theko; Boinyatso under Makotoko and under Boinyatso (Mohale Maama)

(b) the fact that if the person after whom the village was named had two names by which he was popularly known, the village was often called by both names, e.g. Ha Pekosela or Ha Sebakeng, Ha Seoehlana or Ha Mapheleba

(c) the fact that in the case of villages named after chiefs or headmen, the village may either change its name with a successor, e.g. Ha Mothebesoane was now Ha Mosalla; or assume both the previous chief's name and the name of the successor, e.g. Ha Mpiti or Ha Makhosi. In the case of Mothebesoane who left

the village to settle in another area, he carried his name with him to be used in the new area.

(d) the fact that a village may be known by two or more names because it was named both after a person as well as after any other factor or factors named in section 3.3.1, e.g. Ha Seeiso or Motheoaneng, Ha Sekabi or Mahaheng.

(e) the fact that a group of villages may be popularly known by one common name whereas the individual villages did have their own names, e.g. Makeneuoe can be broken into Khoitintle, Koaleli, Kokami, Lillane, and Sekhantso; Mokhokhong (Ha Phillipi) into Maqakalaneng, Mapetja, Matumaneng, and Thotaneng.

As a result of these confusing names, much time was spent in cross-checking the given names against the names provided in the census lists. This also involved going back to the villages for confirmation of a name. The various census lists were consequently also not consistent as far as the village names were concerned. This was probably one of the reasons why some census figures were anomalous, and also why census lists seemed to be incomplete.

3.3.3 Etymology of the names of the villages

As already stated the village names had meaning wherever they were not the proper names of people. There was, however, the tendency among people to shorten the names in colloquial language which ultimately resulted in the names being written in the shortened form, which may not have the same connotation as the original long form, e.g. Tumahole (sound far or renowned afar) was frequently written as Tumaole; Mohlaka-oa-tuka (the

reeds are burning) as Mohlakatuka (burning reeds).

In the same manner villages named after people were written in different forms in the various publications, e.g. Tsunyane - Tsuinyane - Tsoinyane ; Mafefooane - Mafefoane.

Although an attempt was made to use the original forms in this thesis, there were cases where the shortened forms have had to be retained because of the fact that the correct form was discovered rather late, especially after the maps had already been completed.

3.4 Field observation and measurement

The information obtained from the literature as well as from people often raised doubts, either because it was lacking in precision or because it was contradictory. In such cases it became necessary to spend some time in the field observing or measuring.

For instance, the villagers' concept of an acre of land appeared so nebulous and variable that actual measurements had to be taken in order to obtain the English and metric equivalents of the Sesotho acre. The villagers' concept of an acre was uniform only in the sense that they all regarded an acre as 12 steps along the width of the field. The counting was normally done by the men and, although there was often a deliberate shortening or lengthening of the steps according to the motive of the one who counted, an average man's step was about one metre. A Sesotho acre may thus be defined as a 12 metre wide field, irrespective of the length.

The lack of precision about the length, subjected the conception of an acre to individual opinion. For instance, when in the opinion of a landholder his field did not measure up to standard, lengthwise, he called it _serapa_ (diminutive for field) rather than an acre. In the same way a tractor owner, whose charges were generally based on the acre, could regard a very long field as above an acre even though it was only 12 steps wide. The _Farm management and production economics report_ issued by the Khomokhoana development project of the Leribe district in north western Lesotho, states that the farmers in that area had

another way of measuring an acre, namely, that they regarded 12 x 100 steps as being equivalent to an acre. This was apparently an attempt to introduce some standard by which an acre could be measured.

Because of the lack of precision about the length of the acre, it was necessary to take measurements of the lengths of 50 randomly selected fields in ten different areas. The results showed that the fields ranged in length from 94 m. to 191 m. with an average of 120 m. According to this, a Sesotho acre was 12 x 120 m = = 1440 m^2, i.e. about 0.14 ha or 0.35 acre (Eng.)

Similar work was undertaken by staff of the Khomokhoana development project on 84 fields. In their report, however, they did not state what the average length of the field was. They merely provided a conversion formula which, they maintained, was derived from a regression analysis, viz.,

$$Y = 0.32 + 0.74 X$$

where Y = the size of the field in English acres
and X = the size of the field in Sesotho acres.

According to this formula a Sesotho acre was about 0.8 english acre, which was much larger than the 0.35 English acre obtained from the 50 fields sampled in the study area, and also much larger than the 12 x 100 steps (0.3 English acre) used by the farmers in the Khomokhoana project area.

It also became necessary to spend some time in the field observing the activities of the farmers in order to assess the amount of labour and time needed in the various operations.

Other field measurements included the times taken to move from one area to another, the size of a tin or bag to which the farmers so often referred, etc. Most measurements and observations were done in passing during the field checking and questionnaire survey trips.

3.5 The Questionnaire survey

A questionnaire survey or, as it is more appropriately referred to, the structured interview, was carried out in all the sampled areas with a view to collecting data about those socio-economic phenomena which could not be derived from the photographs (see Appendix C).

The actual interviews were preceded by a pilot survey, which was carried out at Mohalenyana on the 21st May, 1976. During the pilot survey a number of flaws were detected and eliminated. Among these flaws was the procedure in sampling respondent villagers. It became apparent that most of the chiefs did not possess a list of the villagers and that the use of random numbers for sampling was not feasible. It also became evident that the chiefs were rather biased in their selection of villagers to be interviewed. A number of questions also needed modification - these included questions about quantities, namely changing units used such as bags to tins.

In the actual interviews the chiefs were asked to call all the villagers together at the traditional gathering place. When all the villagers had arrived, they were given numbers by which random sampling was made possible. The sampled villagers were interviewed as a group, each one answering the same question in turn. Since the questionnaire was designed in such a way that the answers could be entered directly on to the general coding forms, (see Appendix C), it was possible to handle up to 23 respondents at a time by using only three sheets of the coding forms instead of 23 separate questionnaires. The interviewed

Plate 2.

Preparations for group interview at Ratau.

(Photographed by J. Ntebele; printed by Paul Fox).

groups ranged in size from five to 15 villagers.

The disadvantage of this method of interviewing was that it took about two to three hours to go through all 34 questions, and very often some of the respondent villagers tended to lose patience. Fortunately, out of respect for the chiefs none ever abandoned the interview.

Another disadvantage of group interview was that in the case of questions involving opinion, there was a tendency for the respondents to give the same answers. However, this affected only three out of the 34 questions in the questionnaire.

One important advantage of the method was that whenever any respondent gave an incorrect answer he was immediately corrected by the others. Since the villagers seemed to know so much about each other, it could be said that the information obtained by the method of group interviewing was reliable where factual questions were concerned (i.e.31 out of the 34 questions). This was especially true of interviews in which the chief was also present.

Most of the respondents were women and there were a number of questions which the women would have failed to answer if they were asked individually, because they regarded the issues concerned as exclusively men's affairs, e.g. questions related to field size. Where the women failed to answer the questions, the male neighbours were ready to provide the answers. This is recognised as another advantage of the group interviews.

Finally, at the end of the interview session there was an

opportunity to ask a few general questions from the group. For example, when it appeared that nobody in a group was cultivating wheat, the group would be asked to explain why wheat was not popular. This usually generated a very informative discussion, which threw light on many other socio-economic features that were not accommodated in the structured question.

3.6 Discussions with government officials and experts working in Lesotho

The object of these discussions was to get official or expert explanation and opinion on various issues that were encountered in the study area during the fieldwork period. The discussions were usually very informal and took place throughout the fieldwork period. The experts were mainly from the Ministry of Agriculture, the Thaba Bosiu Rural Development Project, and the Khomokhoana Development Project. Similar discussions were held with staff and students of the National University of Lesotho.

3.7 Data processing

The data obtained for the study were transferred into punched cards which were processed by computer using the statistical package for the social sciences (SPSS) programme. The processing of simple tests such as rank correlations or simple descriptive statistics such as mean and range were often processed manually when necessity arose. In the case of tests related to crop yields however, the results were not meaningful because of the fact that there was general crop failure in the 1975/76 agricultural year which diminished any meaningful variability in yields.

3.8 Summary

Airphoto interpretation made it possible to measure the changes in the extent and spatial distribution of the different land use categories that occurred between 1950 and 1976. It also made it possible to measure the incidence of soil erosion, which was one of the major obstacles to agricultural practices in Lesotho. Both the sheet and gully erosion could be identified and mapped, and erosion hazard areas spotted. It was also possible to study the changes in the spatial distribution of population between 1950 and 1976, an exercise that would have proved almost impossible without the use of air photographs. Airphoto interpretation using sequential photographs should provide a new dimension to the methods of gathering data about agricultural resources.

The successful study of the spatial distribution of population and the areal differentiation in the man/land ratios became feasible only after a field survey, that resulted in the production of Figs. 1.3 and 3.11, was completed. Fig.3.11 was the first of its kind to be produced in Lesotho and both Figs.1.3 and 3.11 should provide a base for any studies in the man/land ratios in Lesotho.

In spite of the inconveniences caused to some of the respondents, the method of group interviews in the questionnaire survey was very useful in that it not only provided reliable information to about 88 per cent of the questions but it also ensured that all the questions were answered. At the end of the interview sessions there were often general discussions on a number of issues, some of which were not accommodated in the structured questions, which was another advantage of group interviews.

CHAPTER 4

CHANGES IN PATTERNS AND LEVELS OF AGRICULTURAL PRODUCTION

Production in this chapter should be construed in terms of the science of political economy, as the production of utility rather than the production of matter. It should be taken to include the production of not only human wants but also of basic human needs; however, emphasis will be placed on activities concerned with the raising of crops for food. The discussion will be extended to include the production of exchangeable value, by appropriating and modifying matter that was already in existence.

The first five sections of chapter two included a description of the physical environment of the study area that forms the basic matter (resources) from which the means of livelihood for the inhabitants are produced. Chapter four seeks to examine any changes in the amount and pattern of production and to relate these changes to physical and socio-economic phenomena.

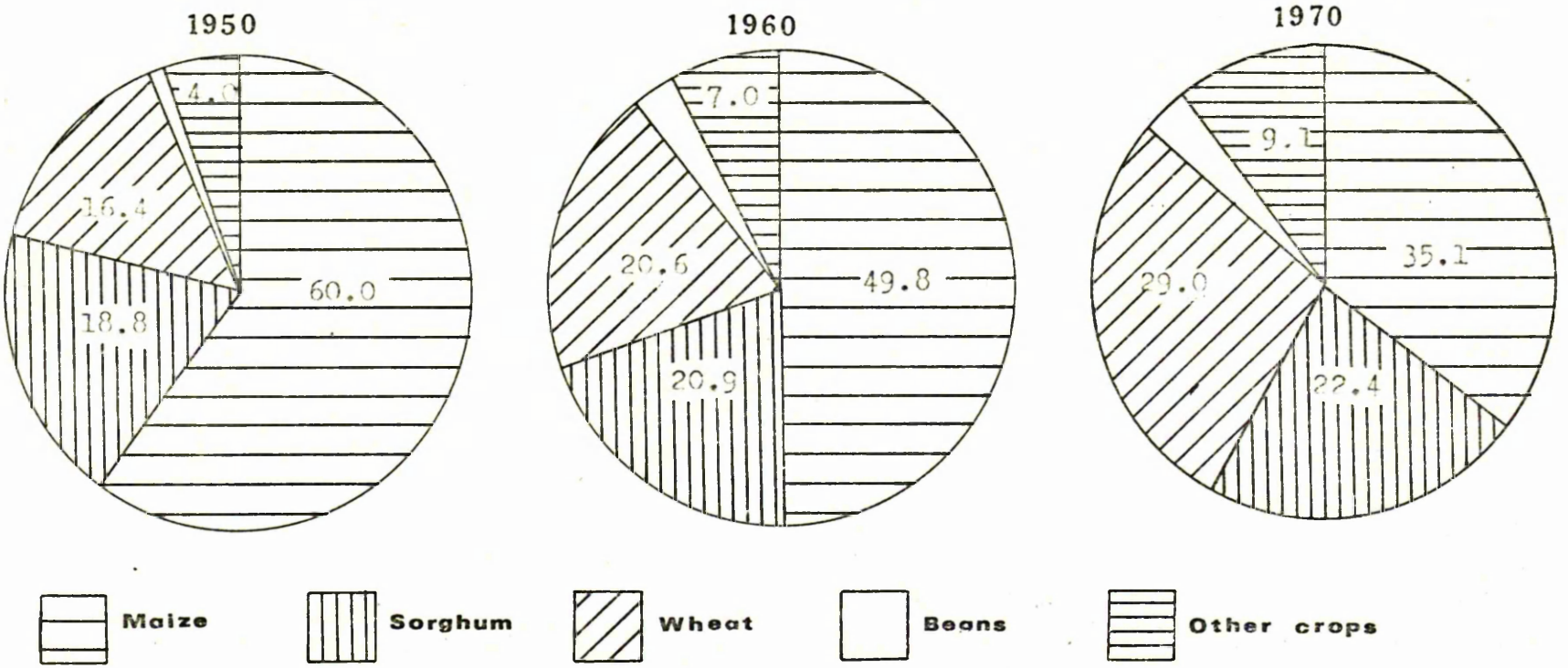
4.1 Changes in the pattern of production

It was stated in chapter two that agriculture was the mainstay of the economy in the study area. A comparison of agricultural production throughout the relatively short history of the territory shows that the pattern of production has remained remarkably unchanged. The same types of major commodities have been produced (see Appendix H). The minor products not reflected in Appendix H include fruits (notably peaches), vegetables and poultry produce all of which are produced on a relatively small scale and mainly for home consumption. The pattern of production of these commodities would almost, without doubt, resemble that of the major commodities in consistency.

There has, however, been a gradual shift of emphasis in the type of crops raised. Whereas about 60 per cent of the cultivated land in 1950 was devoted to the raising of maize, the hectarage of this crop has gradually been decreased to 49.8 per cent in 1960 and 35.1 per cent in 1970 (Fig.4.1). At the same time more emphasis has been placed on the raising of the other crops, notably wheat, which had almost doubled in hectarage between 1950 and 1970. It should be borne in mind that before diamonds entered trade in Lesotho, wheat ranked third in export value. The change of emphasis from the raising of a staple crop (maize) to the raising of a cash crop (wheat) can be attributed to the persistent efforts of Lesotho's administrators to promote the production of wheat, as well as the remuneration received for its sale.

Fig. 4.1

PERCENTAGE AREA UNDER THE DIFFERENT CROPS IN LESOTHO



Source: 1970 Census of agriculture

After 1970, with the introduction of rural development schemes in the territory, other crops have been introduced, namely, potatoes in the Khomokhoana Development Project in the Leribe district, and asparagus production in the Thaba Bosiu Rural Development Project area. In the experimental stations where experiments have been carried out to determine the suitable crop varieties and fertilizers, sunflower is amongst the crops that were being tried. In the study area there was a marked swing towards the raising of beans since the Thaba Bosiu Rural Development Project began work, and it is hoped that the price received by the farmers for the sale of the beans would be attractive enough to encourage more farmers to follow the trend. The question that still remains unanswered, however, is whether there has been any change in the amount of crops produced.

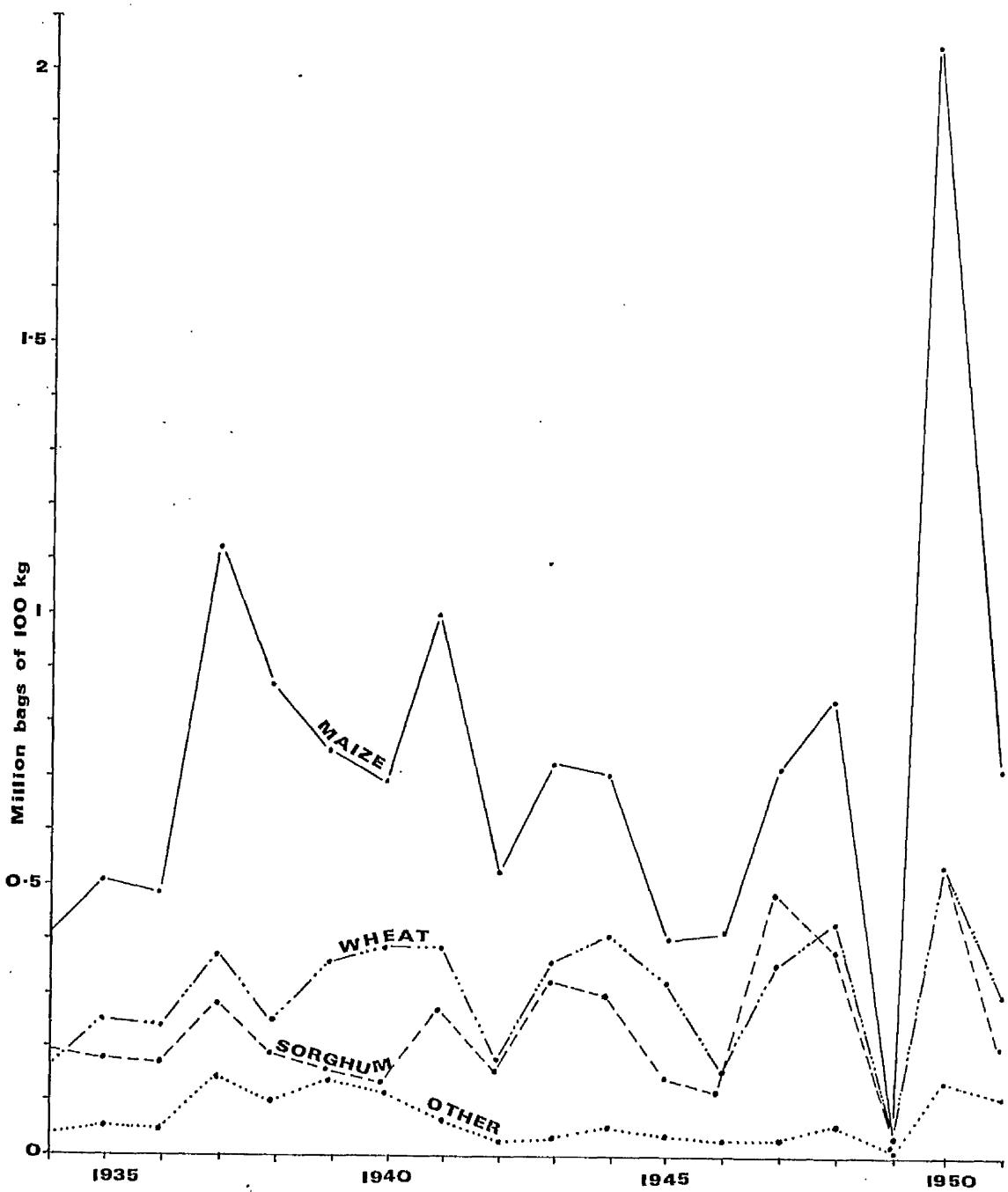
4.2 Changes in the amount of crops produced

As in all less developed countries, the system of keeping production records had not been very accurate in Lesotho. The trade and production figures appearing in the various publications were a little more than rough estimates since they did not include the volume of trade and production of the small farmer who normally has not had his production recorded. But the figures did provide a useful indication of the trend of production and trade.

Crop production figures in the annual agricultural reports for the years 1938 to 1951 showed the same type of fluctuation as found in the export figures (cf. Figs. 4.2 and 4.3). Unfortunately later reports showed only export figures, which may not provide a meaningful comparison with the total production figures. But a mere comparison of crop export figures through the various years (Appendix H) is sufficient to indicate that the fluctuation in production had continued because, all things being equal, the amount of exports will fluctuate more according to changes in the level of surplus production. This was particularly true of Lesotho where there had been a lack of storage facilities.

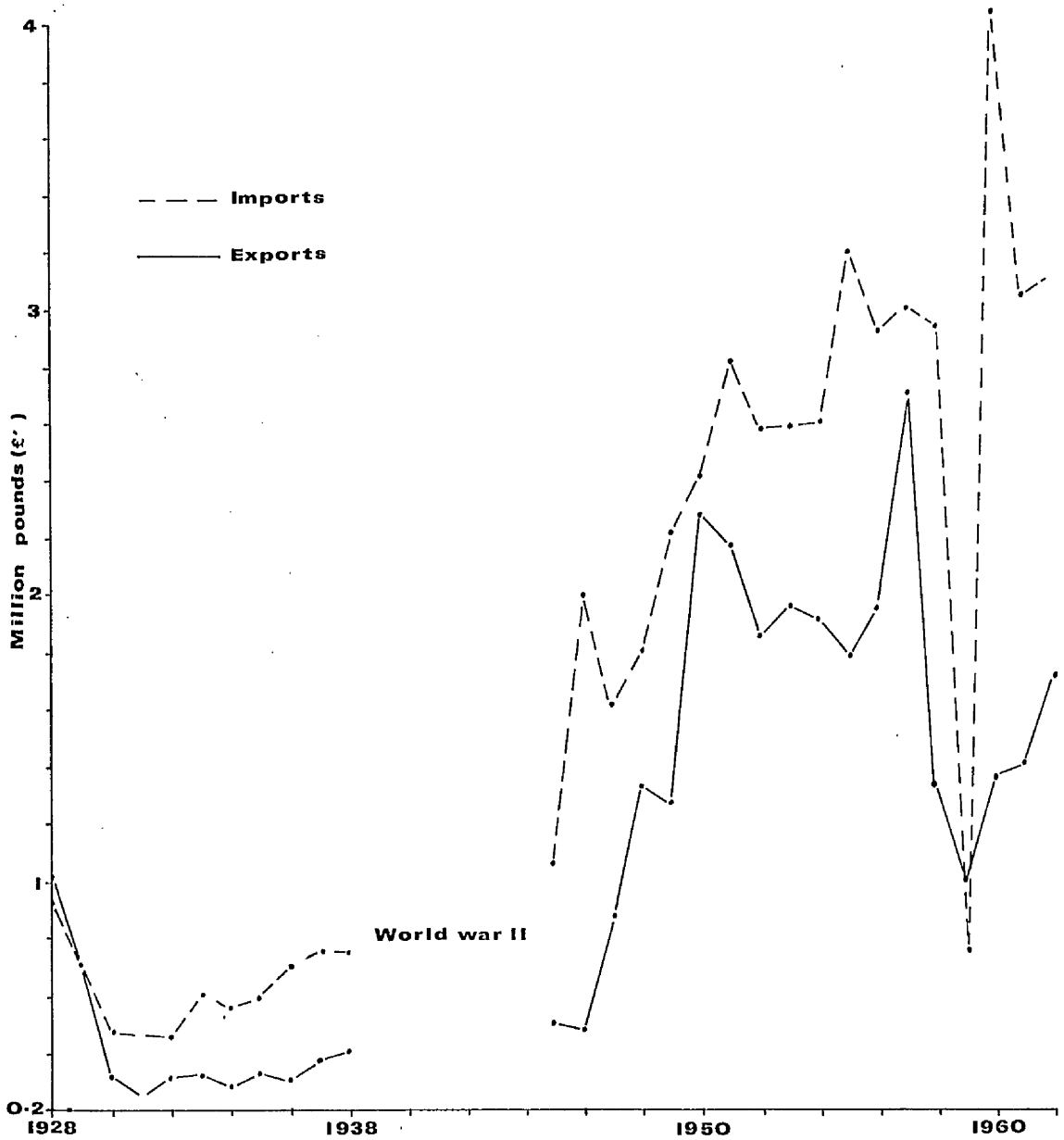
The conclusion to be drawn from the nature of crop production in Lesotho is that it had been fluctuating. But it was difficult to determine the trend of production since there were so many variables associated with it. Writers such as Coates have maintained that the productive capacity of the land per unit area (i.e.yield) was decreasing year by year (Coates 1966, p.65). Section 4.2.1 examines the validity of this statement in relation to changes in the amount of total crop production.

Crop production in Lesotho – 1934 to 1951 Fig. 4.2



Data source: annual agricultural reports

Total value of trade – 1928 to 1962 (in £'s) Fig. 4.3



Data source: colonial reports

4.2.1 The relationship between the fluctuation in crop production and crop yield (i.e. production per unit area) in the period 1942 to 1976.

The purpose of this section is to determine whether the fluctuation in the amount of crop production could be explained in terms of fluctuation in the productive capacity of the land. The average yield in crops, as illustrated in Table 4.1, had been as fluctuating as the total amount of crops produced. This invalidates the statement made by Coates and others that crop yields (or productive capacity of the land) in Lesotho were on the decline.

Table 4.1 Average yield in crops for selected years (100 kg/ha)

Crop	1942	1943	1944	1950	1960	1970	1973	1976
Maize	4.2	4.0	3.6	11.5	8.3	5.8	9.5	3.5
Sorghum	3.1	4.0	2.5	9.0	8.5	7.0	10.1	3.4
Wheat	1.8	2.7	3.1	10.1	7.4	5.4	9.8	-
Beans	4.5	-	-	3.4	3.6	2.2	3.8	2.1
Peas	4.5	-	-	10.1	7.4	4.0	7.0	-

Source:
1. Annual agricultural reports 1942 to 1944
2. Agricultural censa 1950, 1960 and 1970
3. Annual statistical bulletin 1973
4. Fieldwork 1976

Although a visual comparison of Table 4.1 with Fig.4.2 shows that the fluctuation in total crop production generally covaried with fluctuation in yield, the coefficients obtained in correlating the amount of maize and sorghum produced with the yield figures for these crops (viz. 0.2, 0.8 respectively) were not significant. It was only in the case of wheat that there was a significant correlation (coefficient of 1 at the 0.5 level of significance)

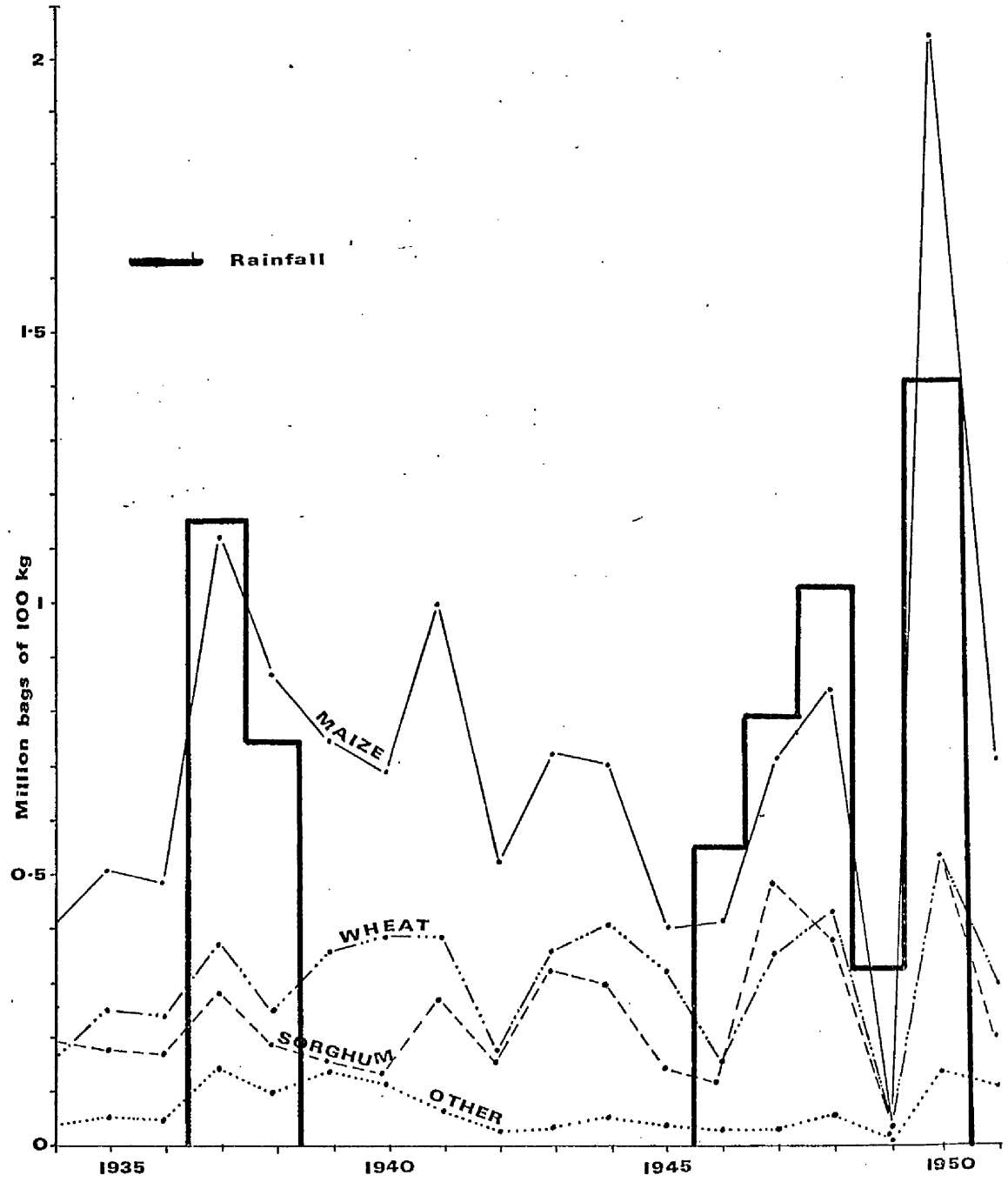
between the amount produced and yield. On closer examination it was observed that there were instances where total production did not necessarily covary with yield. For instance, the maize figure of 1943 compared with that of 1942 shows a decline in yield, yet for the same period there was actually a marked increase in total production (cf. Table 4.1 and Fig.4.2). This shows that there were other factors, either than the fluctuation in yield, that influenced the fluctuation in the amount of production. The fallowing of fields could, for example, affect total production in crops without necessarily affecting yield. The factors influencing crop production were, however, so interwoven in their action that it was difficult to analyse in isolation the effects that any one of them had on crop production. However, for the sake of simplification and systematic discussion, the factors associated with crop production will be examined individually in the sections that follow in order to determine the extent to which each was related to the fluctuation in crop production.

4.2.2 The relationship between weather conditions and the fluctuation in crop production

Moisture is one of the basic necessities for plant growth and in the study area where there was no irrigation, rainfall was crucial to crop raising. Fig.4.4 shows that there was a relationship between fluctuation in the amount of rainfall and fluctuations in crop production. Unfortunately there was insufficient data to test this relationship. However, it could be said that more crops were produced during the years when rainfall was good and that crop production fell during drought years. But whilst acknowledging the fact that the amount of rainfall *per se* is a factor largely influencing the production of crops in Lesotho, it should be noted that the characteristics of the rainfall that make it more crucial to crop production are its timing and intensity. Because of these two characteristics the different crops raised in the territory for any one year may not necessarily be affected in the same way by the total rainfall figures. For instance, whereas the production of maize and sorghum fell in 1939 as compared to the previous year, the production of wheat and other crops rose (Fig.4.2). The 1938 annual report of agriculture gives an account of crop production that further illustrates this point, namely, that the production of wheat, maize and sorghum was poor that year whilst the production of beans, peas and barley was high; the discrepancy being attributed to the timing of the rainfall. Fig.4.5 shows the crop calendar and monthly distribution of rainfall in Lesotho, and from it one can see how a deficiency in rainfall in any one month could affect the different crops.

The annual reports of the territory give valuable information

Crop production in Lesotho (1934 to 1951) and rainfall Fig. 4.4

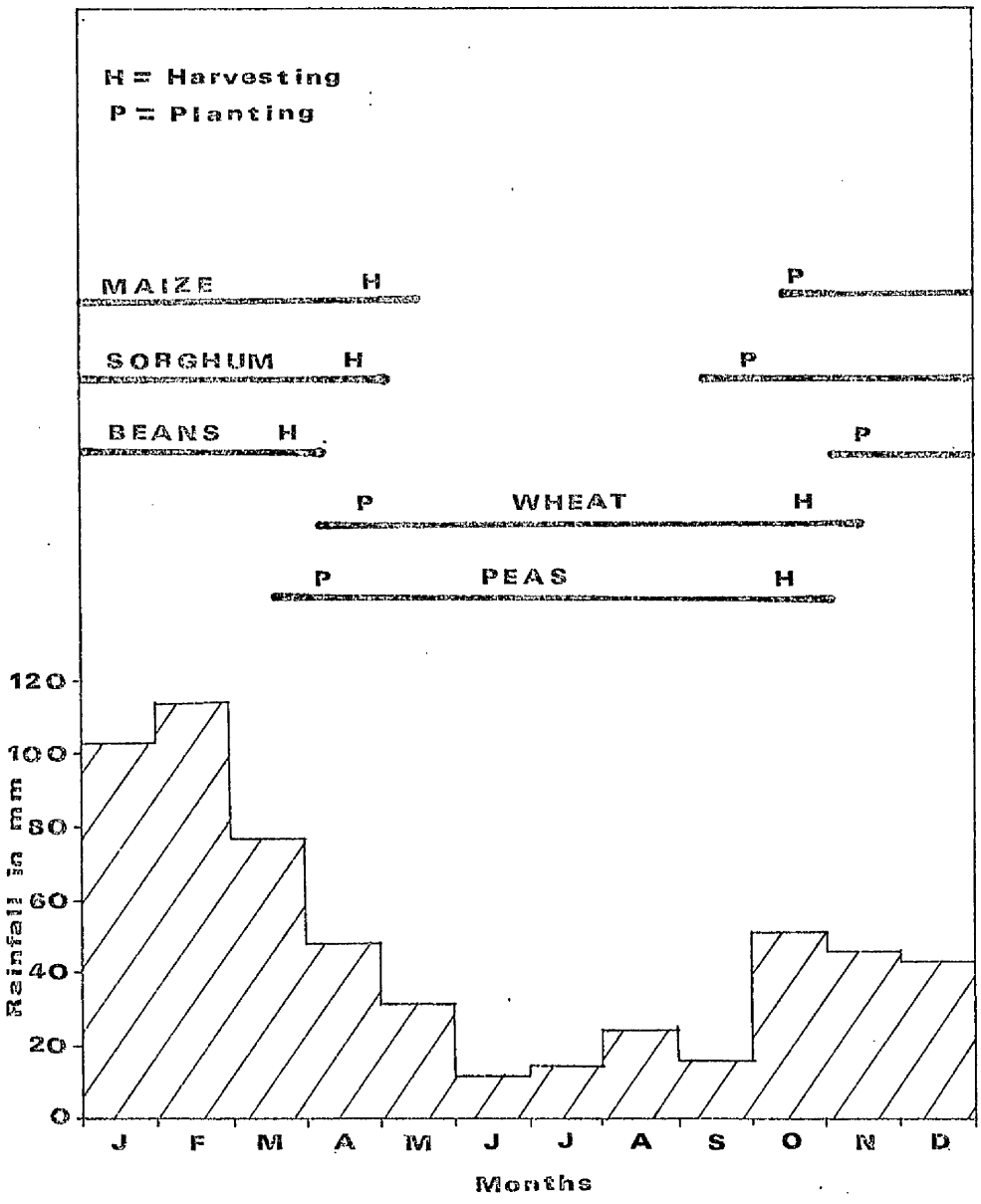


Source: annual agricultural reports

Fig. 4.5

Cropping calendar and monthly rainfall (TBRDPA)

(Roma station average rainfall, 1971–75)



on the character of the rainfall and its effects on crop production. Excerpts of these have already been quoted in section 2.2 and what follows here is an attempt to give further explanation of the fluctuating graphs of Fig.4.2 in terms of the reasons given in the annual reports:

In 1945, 1946, 1949 and 1951,the spring and summer rains failed to come resulting in drought conditions at a crucial planting and growing time. The results were general failure of all summer crops. In 1946 there was a further set back to the lowland crops caused by six weeks of drought during February and March.

The low production of crops in 1942 was largely due to early frost. It is important to note that unseasonable frosts are said to have caused low production during the years 1935, 1936, and 1965 as well (see section 2.2). Another climatic factor frequently causing crop failure in Lesotho was hail. It can therefore be concluded that, with the prevailing absence of means of counteracting its catastrophic effects, the adverse weather that frequently afflicts the territory at crucial periods of the cropping season was largely responsible for the fluctuations in crop production.

Having established that adverse weather was one of the factors that were inimical to crop raising in Lesotho, it would be proper to look at the area on which the crops were raised to see if there were any changes in its size that could have contributed to the low and fluctuating production in crops.

4.2.3 The relationship between the changes in the extent of cultivated land and the fluctuations in crop production

From mere observation the first impression is that the area of cultivated land in the study area was gradually being diminished by encroachment by villages as well as by soil erosion. The purpose of this section is to examine this impression and to determine any relationship between changes in the size of cultivated land and the amount of crops produced.

On examining the area of Mafefoane (Figs.4.6 to 4.9 and Table 4.2) it was found that the total area under cultivation in 1950 was about 809 ha.

Table 4.2 Land use in the area of Mafefoane, by period and size (ha)

Year	Cultivated	Settlements	Grazing	Total
1950	809	247	634	1690
1961	755	292	643	1690
1971	719	328	643	1690
1976	689	358	643	1690

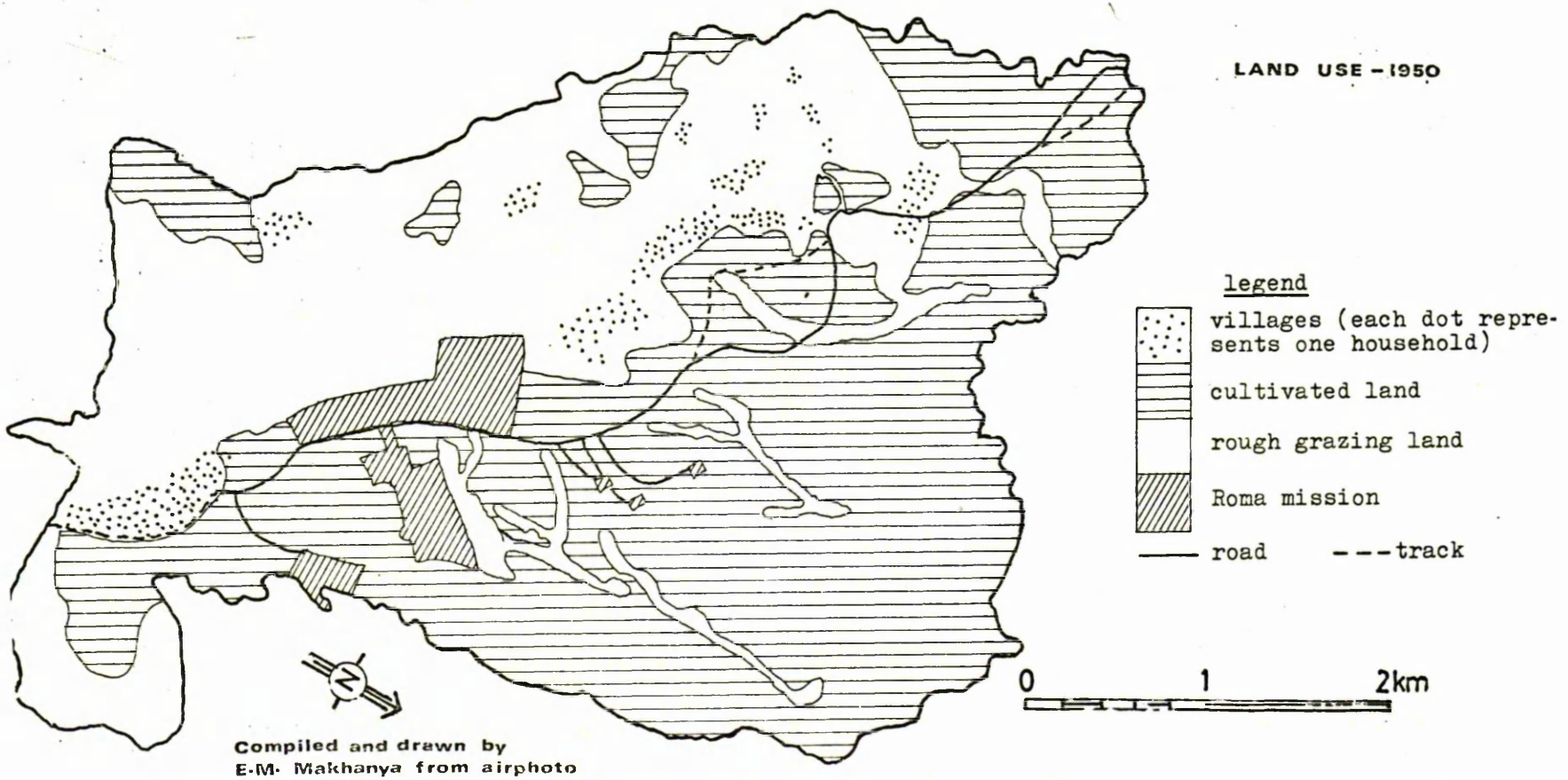
Source: Air photo interpretation and field checking

In 1961, 1971 and 1976 it was 755, 719, and 689 ha respectively. The area of cultivated land was thus reduced between 1950 and 1976 by a total of 120 ha or 14.8 per cent; about 111 ha of which were converted into villages and institution buildings, and the remaining nine hectares reduced to rough grazing by soil erosion.

However, the results obtained from a similar treatment of the

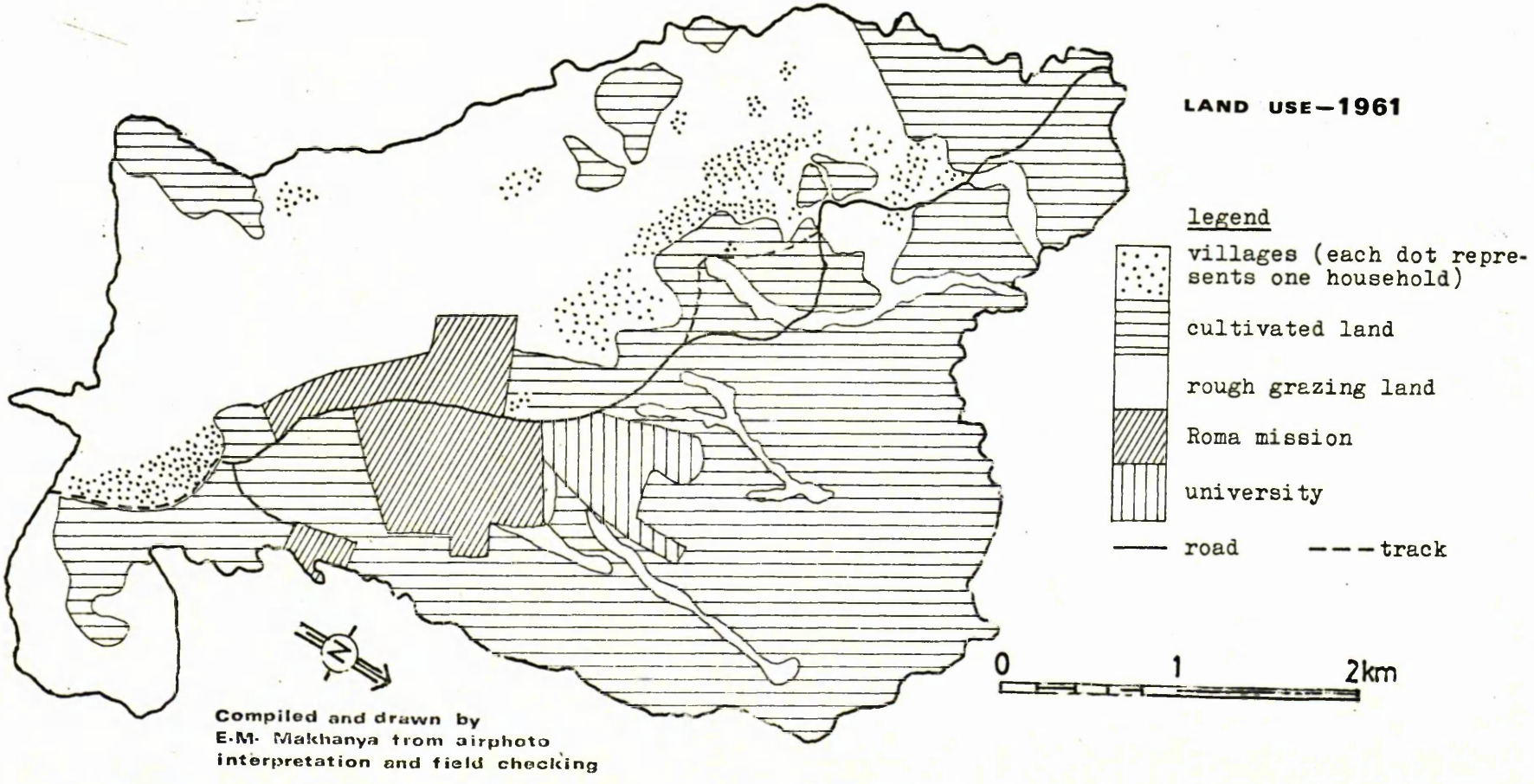
The area of Mafefoane

Fig. 4.6



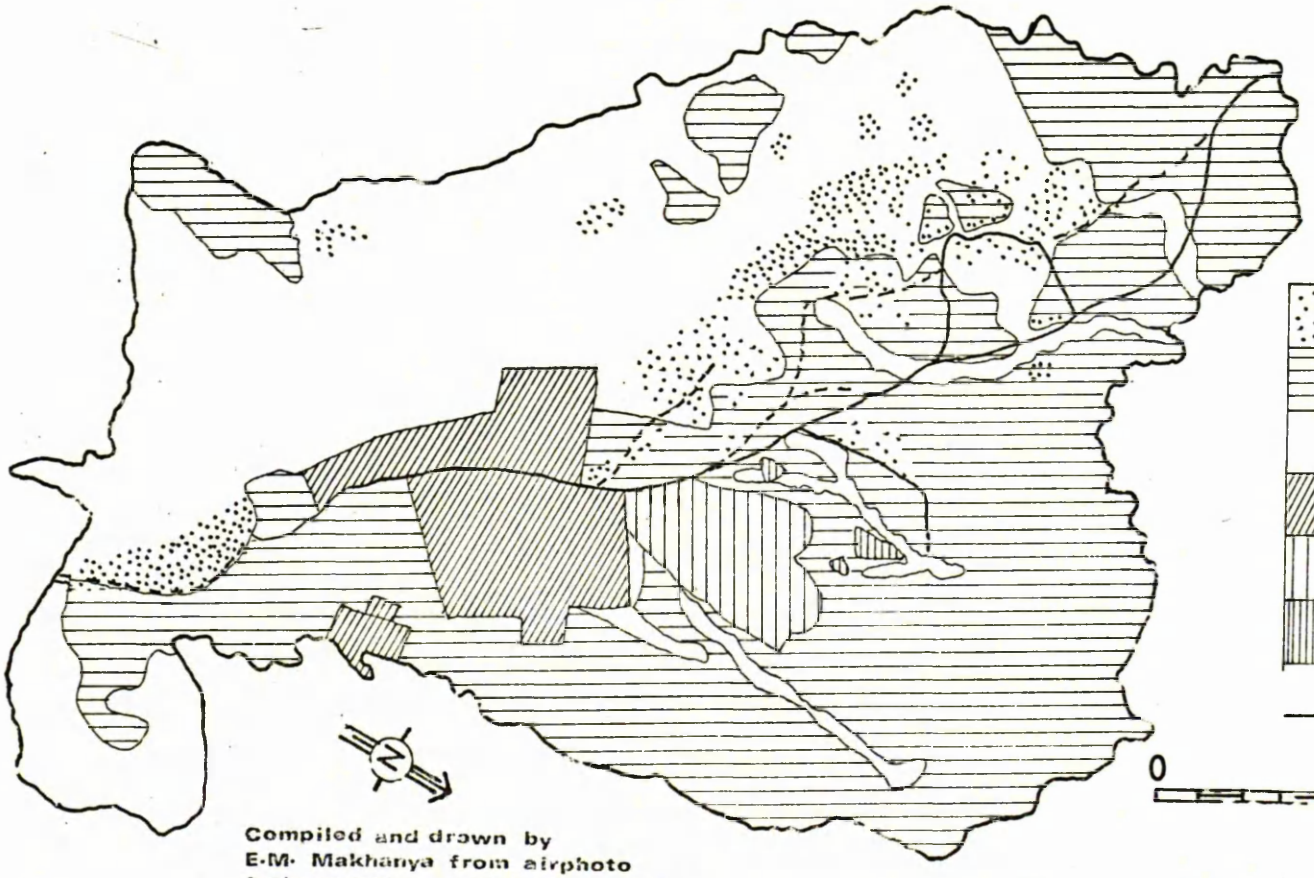
The area of Mafefoane

Fig. 4.7



The area of Mafefoane

Fig. 4.8



LAND USE, 1971

legend

villages (each dot represents one household)

cultivated land

rough grazing land

Roma mission

university

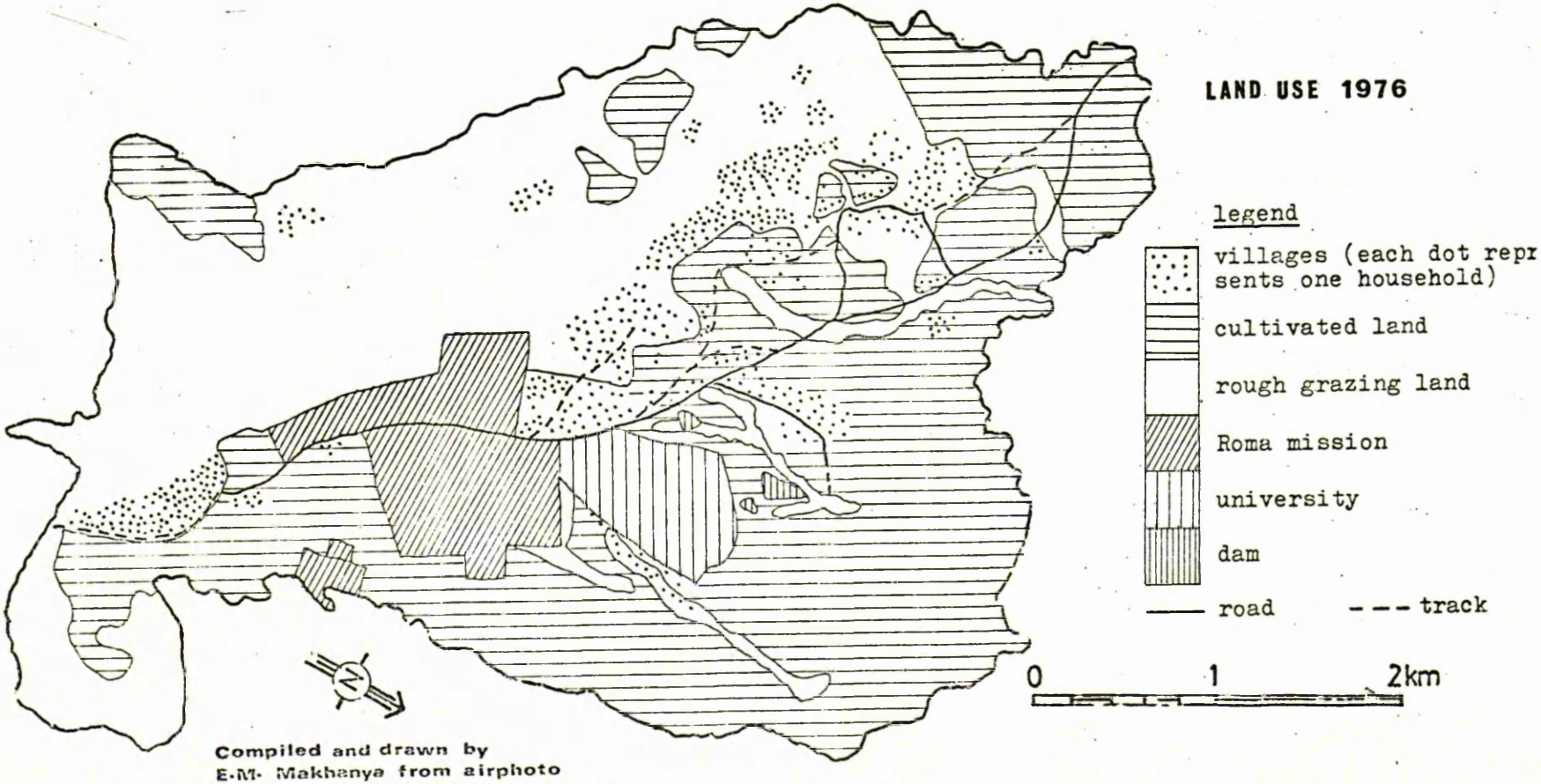
dam

road — track

0 1 2km

The area of Mafefoane

Fig.4.9



remaining seven of the sampled areas did not support the hypothesis that cultivated land was encroached on by villages. For it was only in two, namely Musuoe Theko (Figs. 4.10 and 4.11) and Thaba Khupa (Figs. 4.12 and 4.13) that a decrease in the area of cultivated land of only 20 ha and 2 ha respectively was noticed (see Tables 4.3, 4.4, and 4.5). The net result from the eight areas was an increase of 59 ha or 0.5 per cent of the total cultivated land.

In the study area as a whole about 18,706 ha were cultivated in 1950/52. This figure was increased by about 4.3 per cent to 19,550 ha in 1976 (Figs. 4.14 and 4.15). As illustrated in the case of the sampled areas (Table 4.5) there were differences from area to area in the nature of change in the extent of cultivated land throughout the study area. On the whole, more land was brought under the plough than was abandoned.

Table 4.3 Land use in the sampled areas - 1950

Area	Cultivated		Settlements		Rough Grazing		Total
	ha	%	ha	%	ha	%	ha
Boinyatso	1604	63	196	8	732	29	2532
Mafefoane	809	48	247	15	634	37	1690
Molengoane	237	64	18	5	117	31	372
Musuoe Theko	912	50	144	8	772	42	1828
Ralejoe	275	52	22	4	233	44	530
Ratau	1260	46	262	10	1210	44	2732
Thaba Bosiu	894	43	181	9	1005	48	2080
Thaba Khupa	509	78	22	3	124	19	655
Total	6500	55	1092	8	4827	37	12419

Source: Air photo interpretation and field checking

Table 4.4 Land use in the sampled areas - 1976

Area	Cultivated		Settlements		Rough Grazing		Total
	ha	%	ha	%	ha	%	ha
Boinyatso	1604	63	202	8	726	29	2532
Mafefoane	689	41	358	21	643	38	1690
Molengoane	304	82	33	9	35	9	372
Musuoe Theko	892	49	220	12	716	39	1828
Ralejoe	320	60	25	5	185	35	530
Ratau	1324	48	272	10	1136	42	2732
Thaba Bosiu	919	44	219	11	942	45	2080
Thaba Khupa	507	77	65	10	83	11	655
Total	6559	58	1394	11	4466	31	12419

Source: Air photo interpretation and field checking

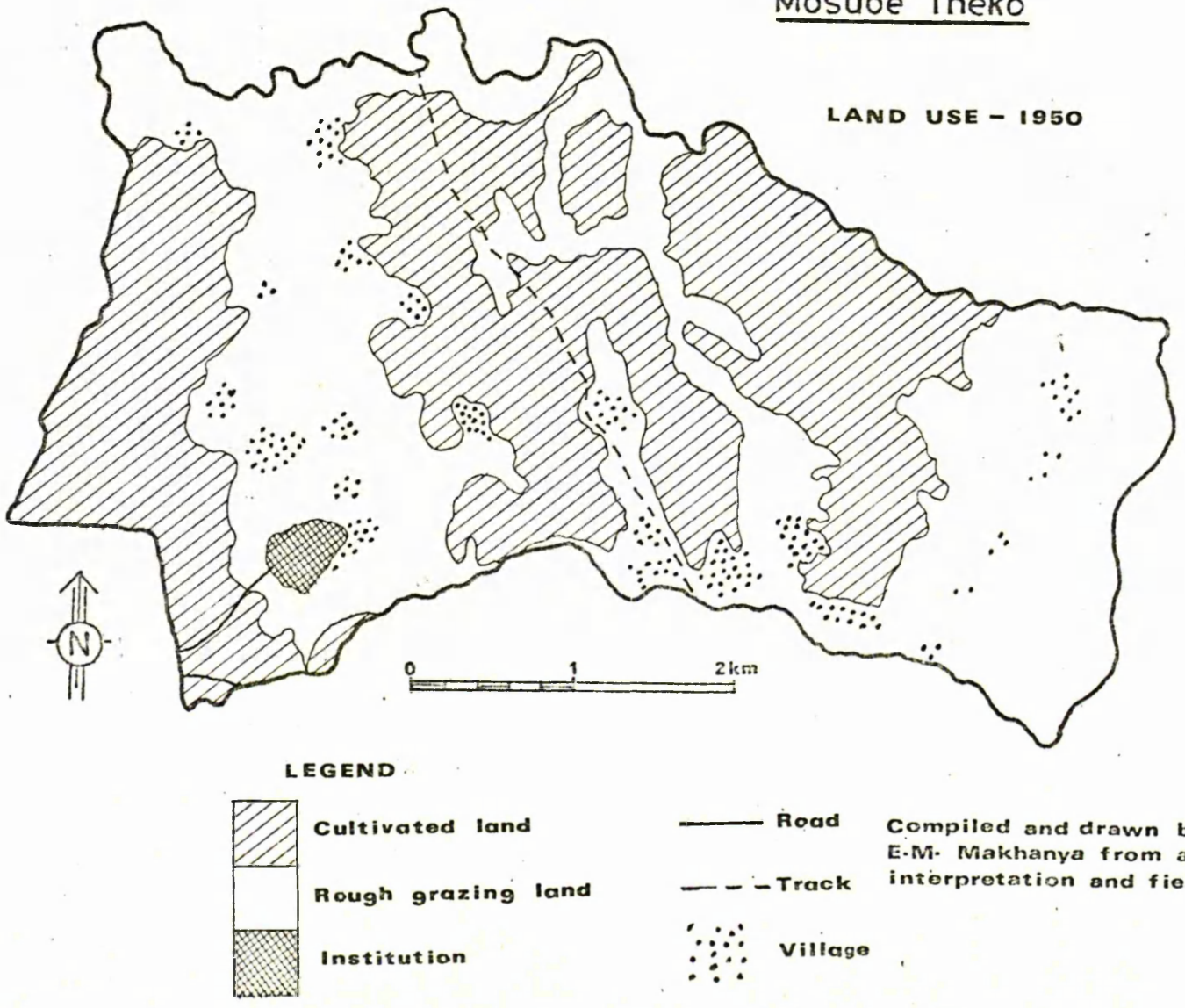
Table 4.5 Change in the extent of land use categories (1950-1976)

Area	Cultivated		Settlements		Rough Grazing	
	ha	%	ha	%	ha	%
Boinyatso	0	0	+6	+0.2	-6	- 0.2
Mafefoane	-120	- 7.1	+111	+6.6	+9	+ 0.5
Molengoane	+67	+18.0	+15	+4.0	-82	-22.0
Musuoe Theko	-20	- 1.1	+76	+4.2	-56	- 3.1
Ralejoe	+45	+ 8.5	+3	+0.6	-48	- 9.1
Ratau	+64	+ 2.3	+10	+0.4	-74	- 2.7
Thaba Bosiu	+25	+ 1.2	+38	+1.8	-63	- 3.0
Thaba Khupa	-2	- 0.3	+43	+6.6	-41	- 6.3
Total	+59	+ 0.5	+302	+2.4	-361	- 2.9

Source: Air photo interpretation and field checking

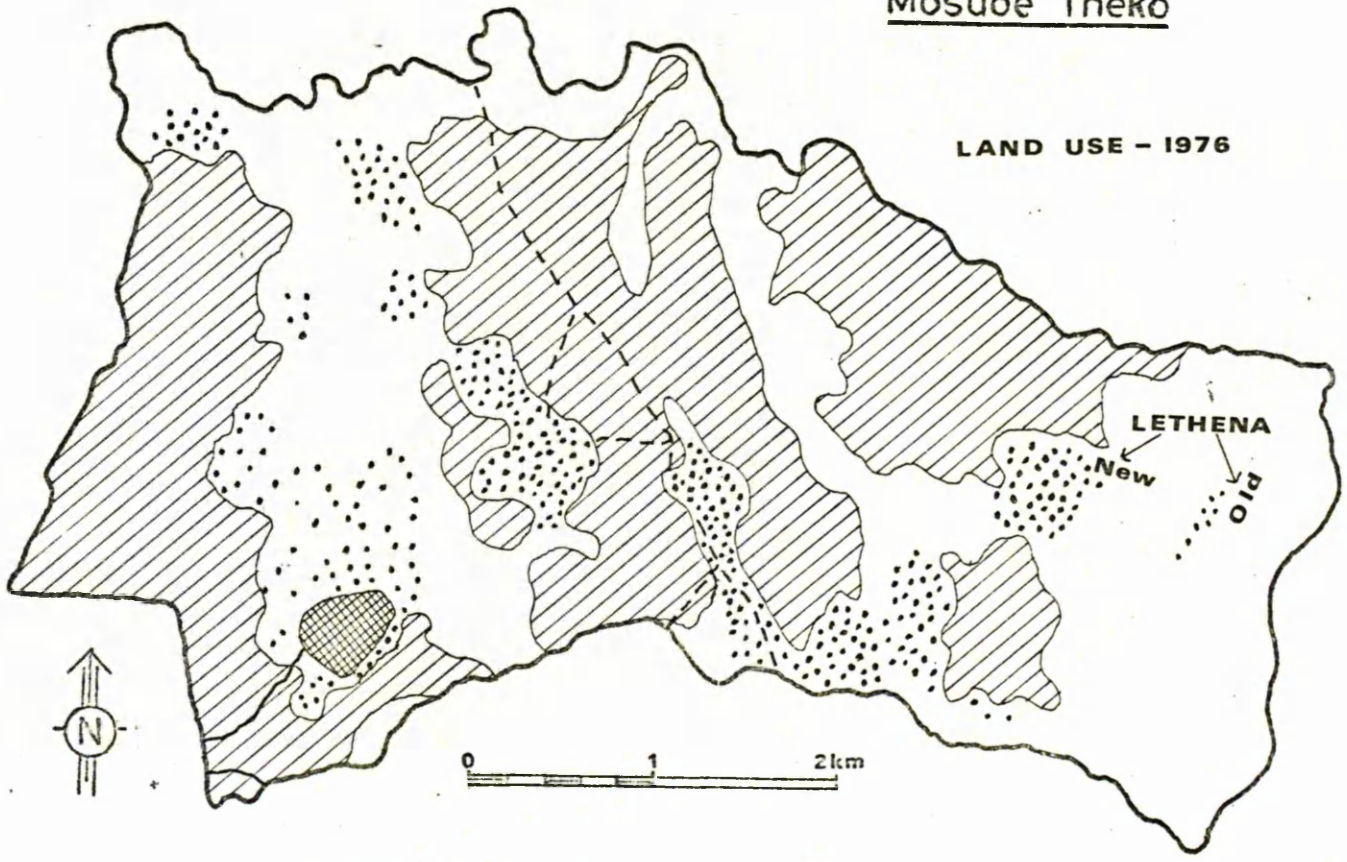
Figures for the territory as a whole show that there was, between 1950 and 1970, a net decrease in the area of cultivated land of 8,182 ha or 2.2 per cent (Table 4.6). There was a remarkable zonal differentiation in the territorial change in

Fig. 4.10


Mosuoe Theko
LAND USE – 1950
N
0
1
2km
LEGEND
Cultivated land
Rough grazing land
Institution
Road
Track
Village
Compiled and drawn by
E-M- Makhanya from airphoto
interpretation and field checking

Mosuoe Theko

Fig. 4.11



LEGEND

Cultivated land

Rough grazing land

Institution building

Road

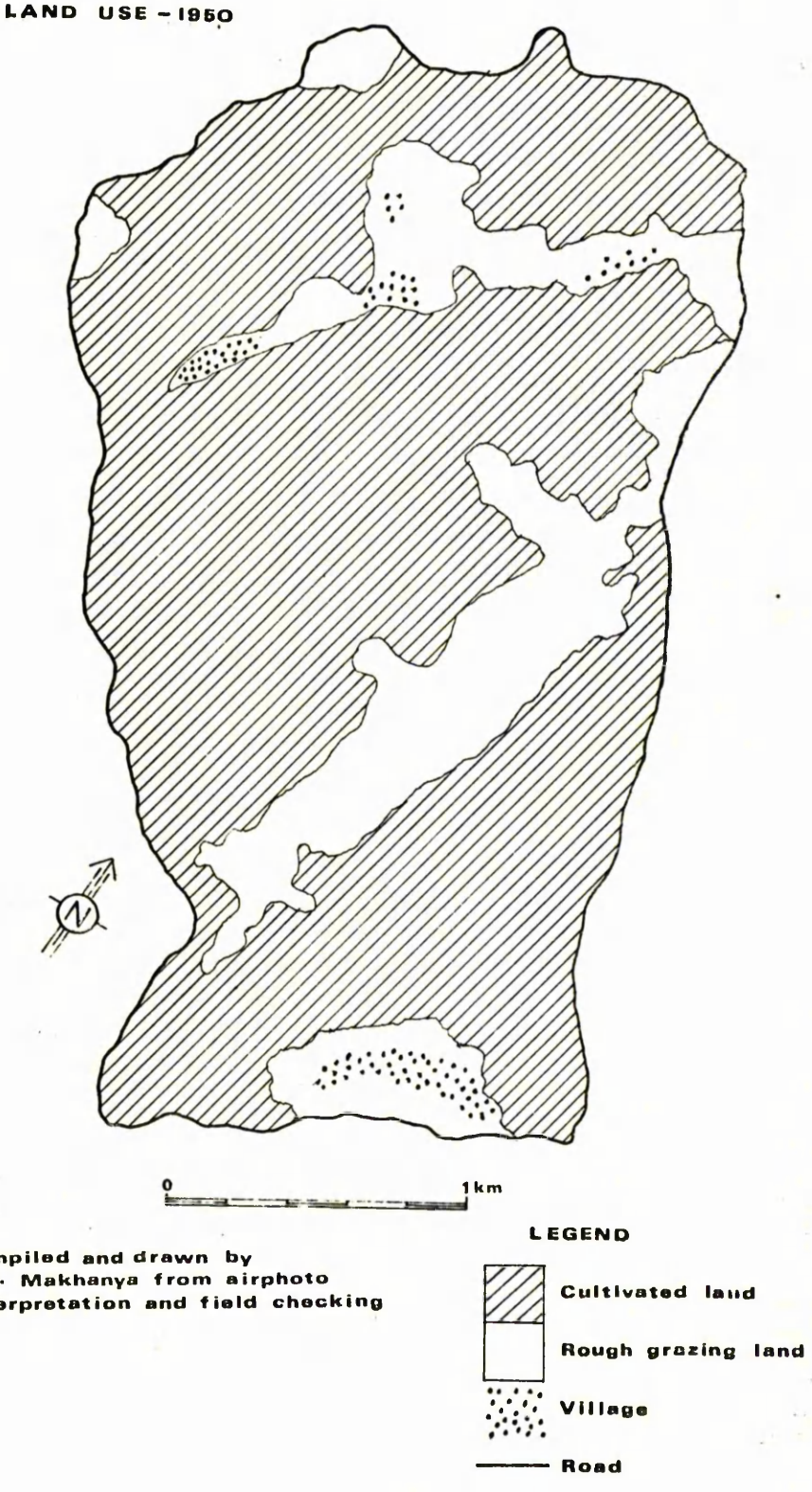
Track

Village

Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

Thaba khupa

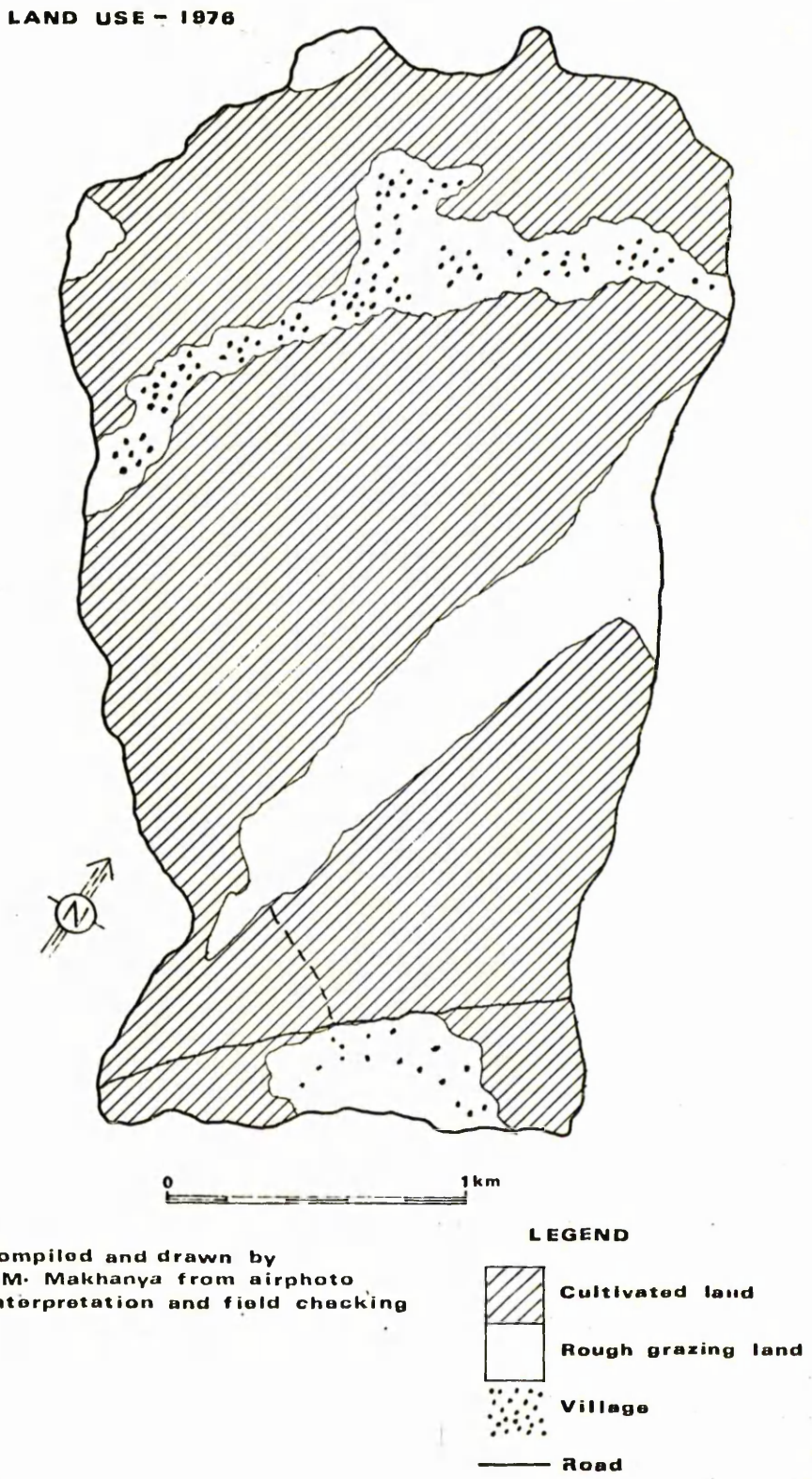
Fig. 4.12



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

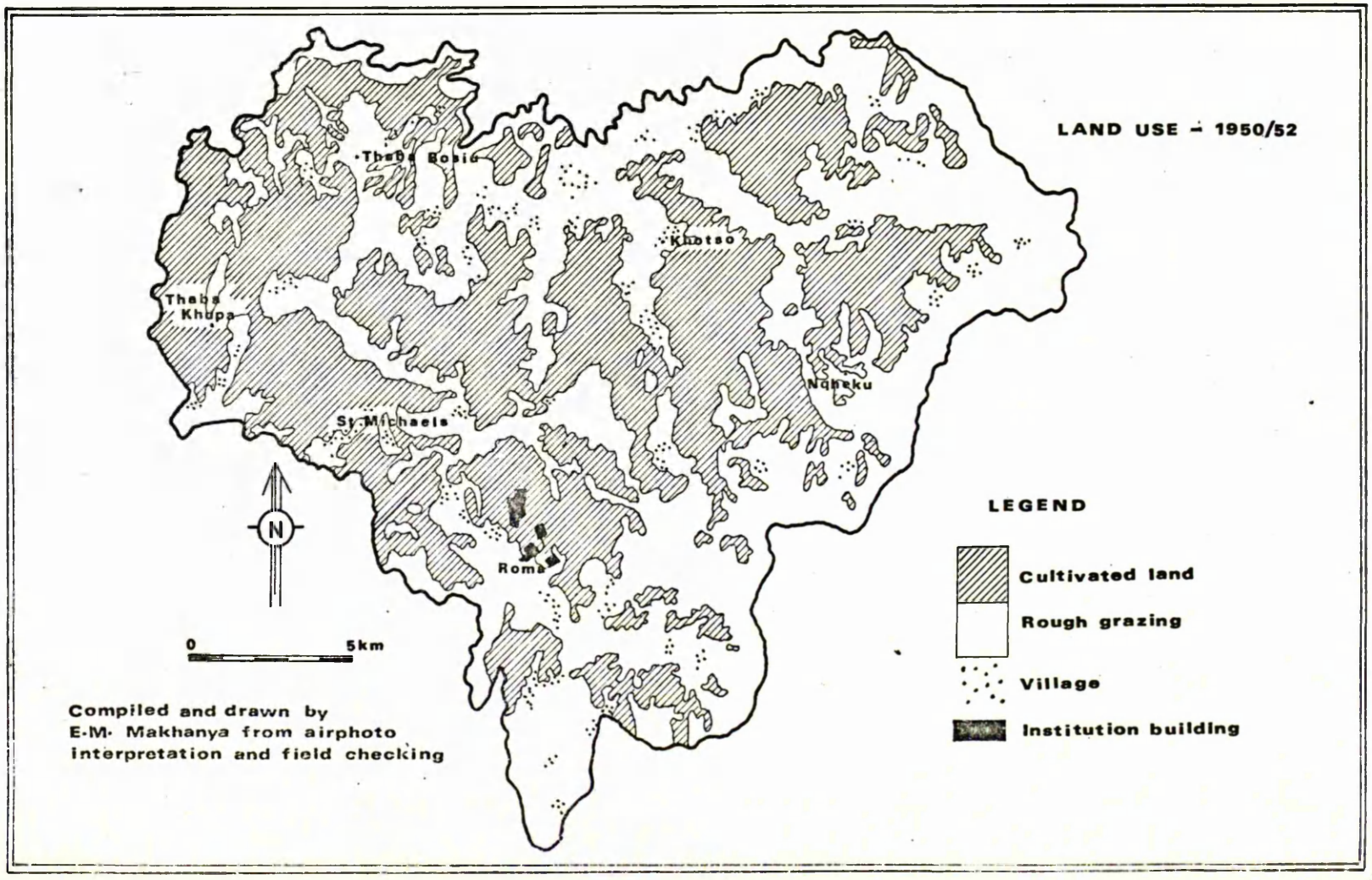
Thaba khupa

Fig. 4.13

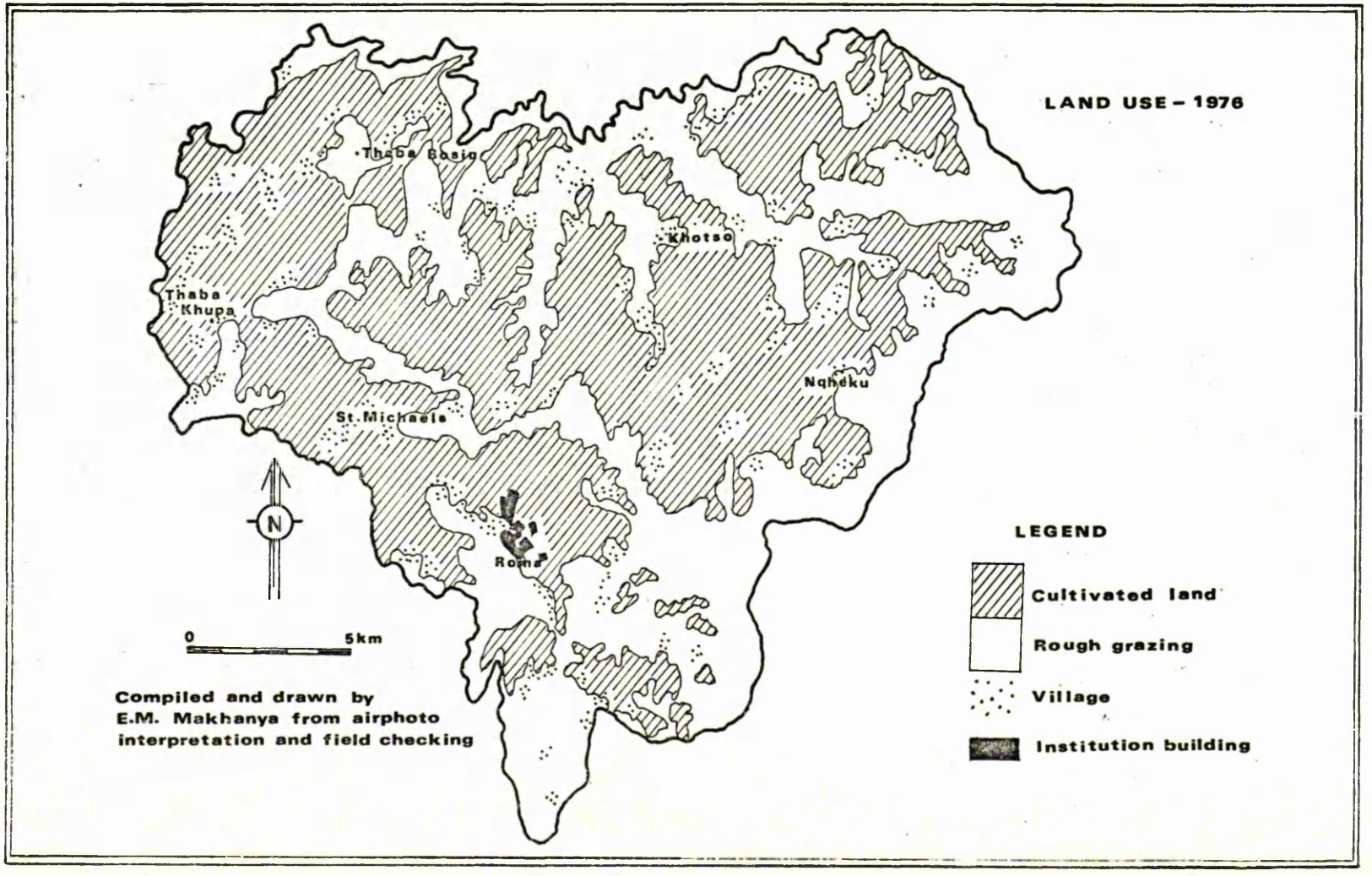


Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 4.14



Thaba Bosiu Rural Development Project Area (Area 1) Fig. 4.15



the extent of cultivated land, and this zonal differentiation will now be reviewed in the context of the study area.

Table 4.6 Cultivated areas in Lesotho, by zone (in ha)

Zone	1950	1960	1970
Lowland	212955	164874	178355
Foothill	44534	60294	92578
Mountain	71255	95915	65693
Orange River Valley	47773	31828	31709
Total	376517	352911	368335

Source: Monyake,L.B. p.63

4.2.3.1 The relationship between agricultural zones and change in the extent of cultivated land

Table 4.6 shows that whereas the area of cultivated land decreased in the lowland, mountain and Orange River valley zones between 1950 and 1970, it more than doubled in size in the foothill zone. The reason why there was a decrease in the area of cultivated land in the mountain and Orange River valley zones is probably that much of the land cultivated in these zones should not have been cultivated at all as it was rugged and therefore unsuitable for cultivation. Soil erosion obviously forced many land holders to abandon their fields, but since neither of the two zones occurs in the study area more attention will be given to the foothill and lowland zones.

The increase in the extent of cultivated land in the foothill zone was accompanied by a proportional increase in the number of land holdings (Table 2.4). This meant that the increase in

the extent of cultivated land resulted from the fact, that virgin land was opened up for cultivation by newly settled households. The situation in the lowland zone was rather complicated because, judging from the rate of increase in the number of land holdings (Table 2.4), it would seem that not much new land was brought under the plough yet there were about 1,285 households which reported that they ploughed up virgin land during 1970 as opposed to 1,140 in the foothill zone. In terms of size this was about 2,186 ha in the lowland zone and 755 ha in the foothill zone (Lesotho Govt. 1972). The fact that the amount of virgin land ploughed up in the lowland zone contradicted the figures in Table 4.6 was evidence of the fact that there was also more land abandoned in the lowland zone, probably as a result of encroachment by erosion and settlements as explained in section 4.2.3. It also meant that the ploughing up of virgin land in the lowland zone was done by households that already had land holdings.

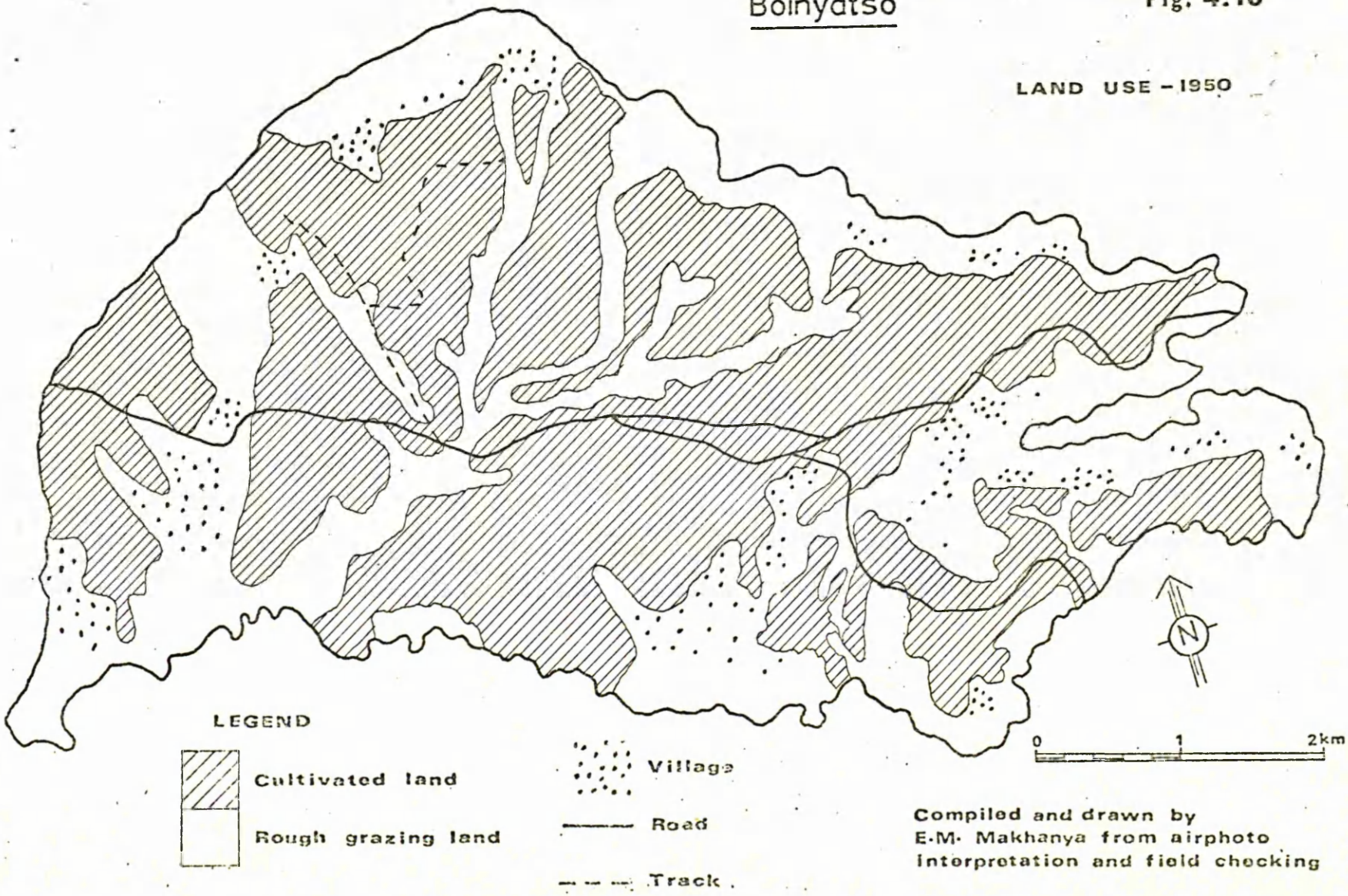
A review of Table 4.5 (see also Figs. 4.16 to 4.21) shows that of the four areas sampled in the lowland zone (i.e.Boinyatso, Mafefoane, Thaba Bosiu and Thaba khupa) it was only at Thaba Bosiu that there was an increase in the area of cultivated land. On the other hand, among the four areas sampled in the foothill zone there was an increase in the extent of cultivated land in three and a decrease in only one. These results were in accordance with the figures in Table 4.6, and could be explained in the same way.

While accepting the fact that there were, within each zone, differences from area to area it could be stated in general that

Boinyatso

Fig. 4.16

LAND USE – 1950



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interpretation and field checking

Boinyatso

Fig. 4.17

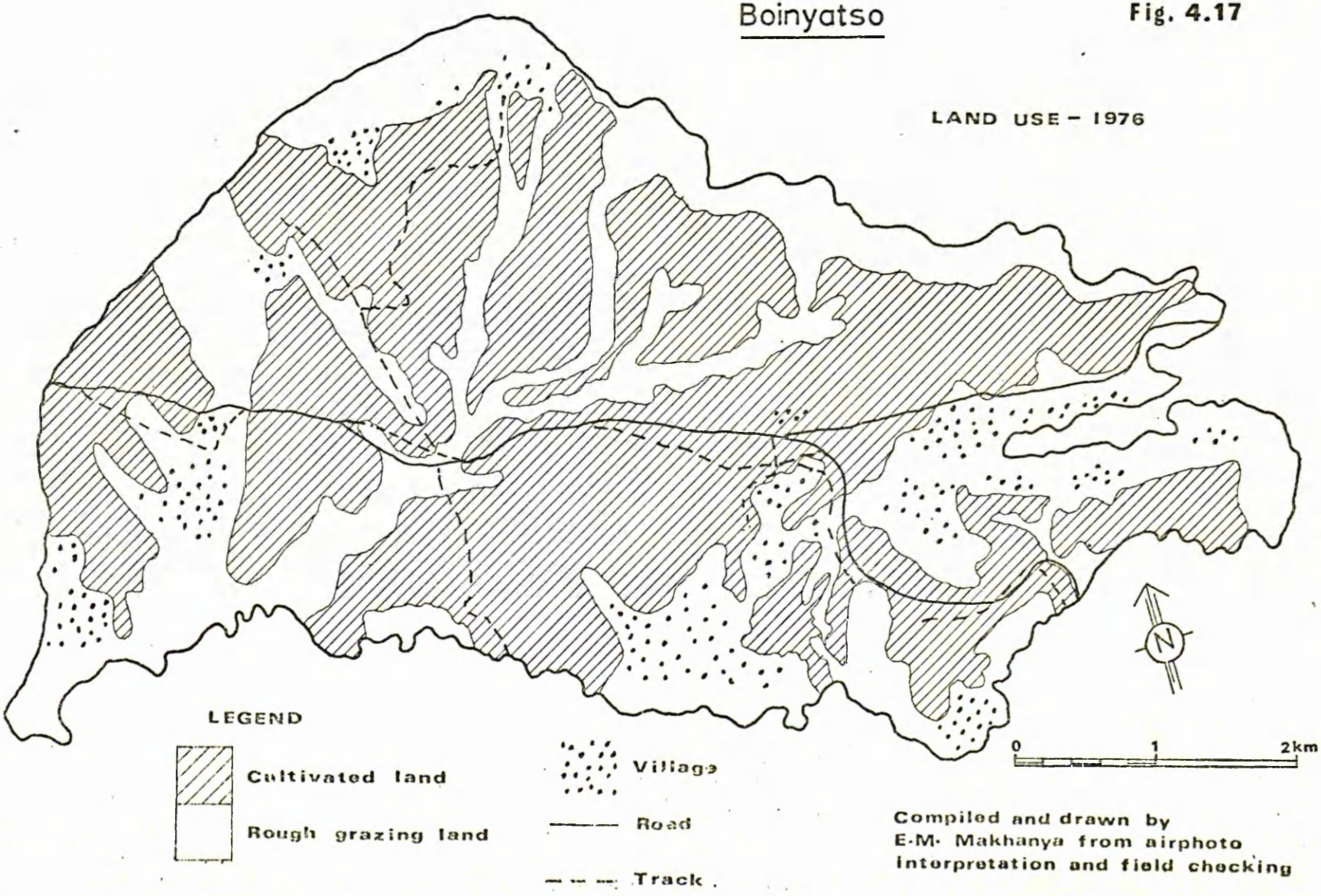


Fig. 4.18

Ralejoe

LAND USE – 1950

Legend

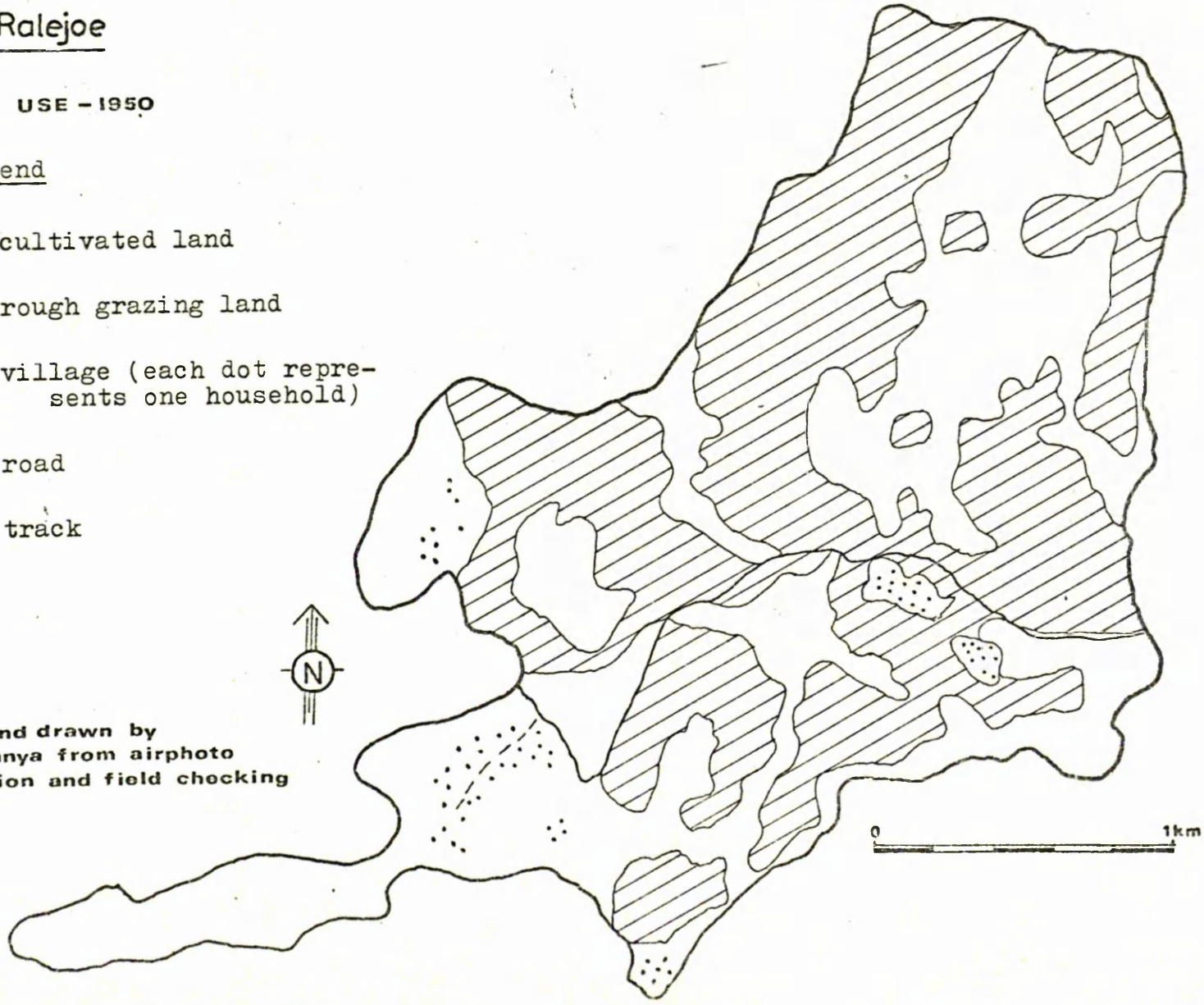
cultivated land

rough grazing land

village (each dot represents one household)

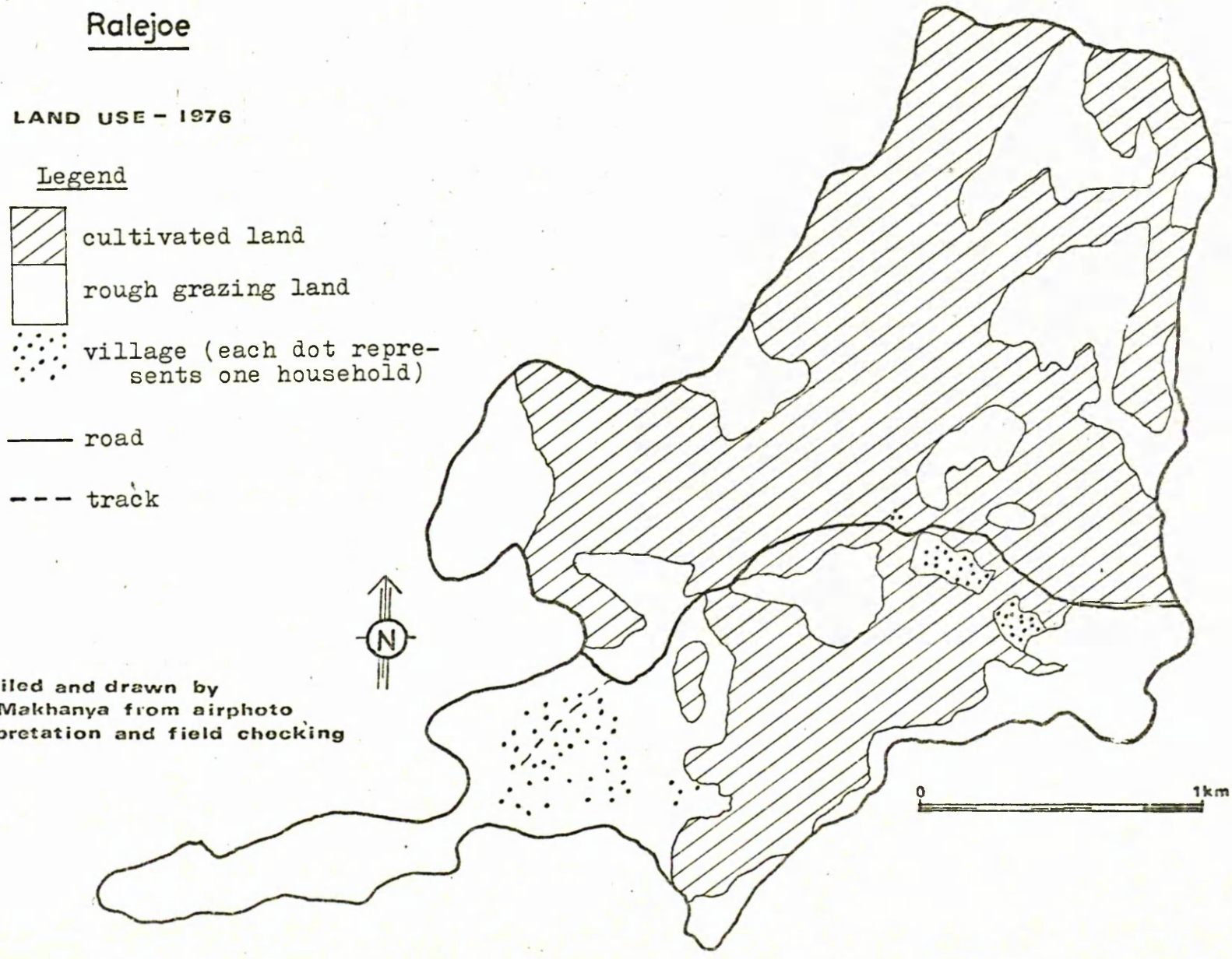
road

track



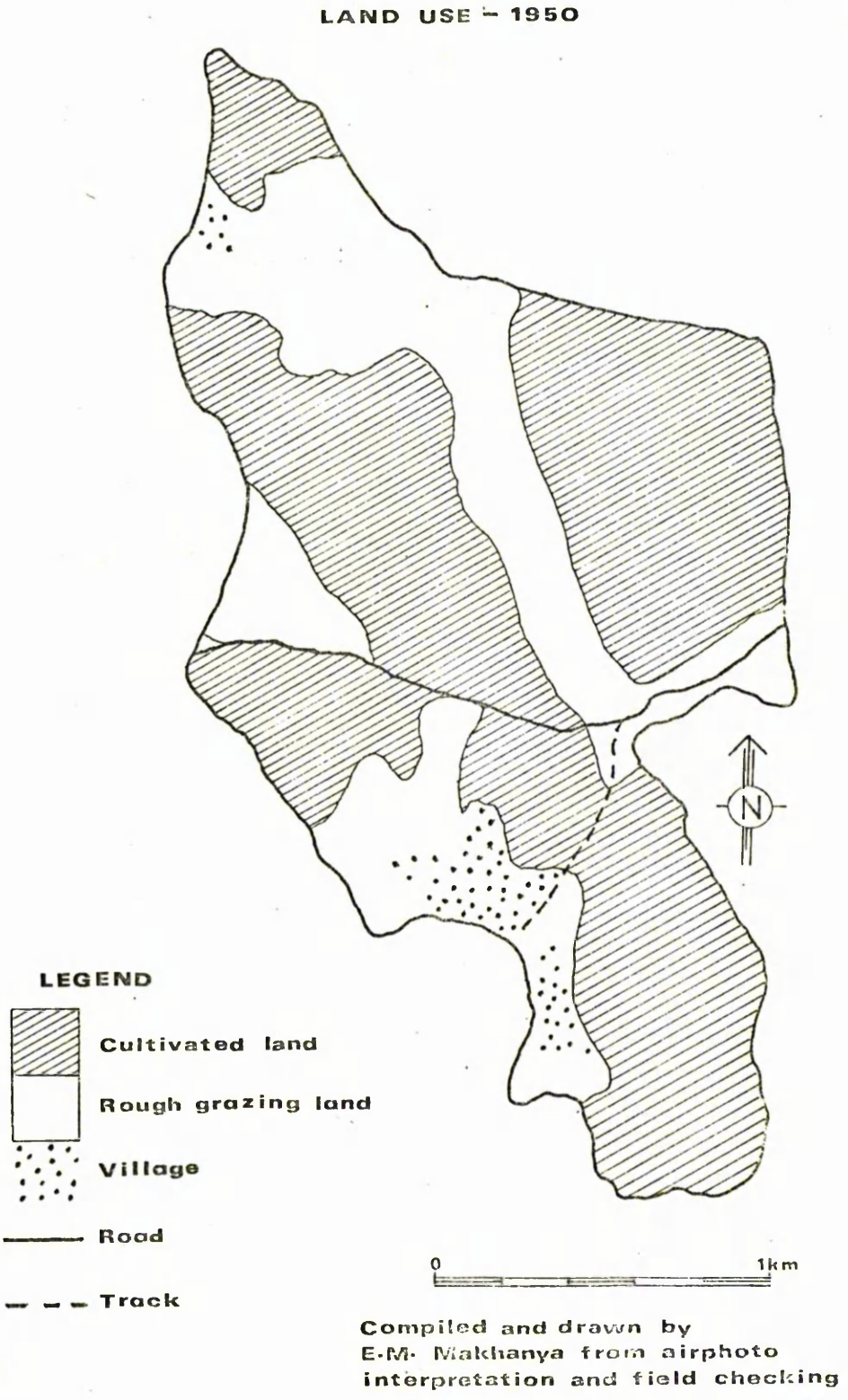
Compiled and drawn by
E.M. Makhanya from airphoto interpretation and field checking

Fig. 4.19


Ralejoe
LAND USE - 1976
Legend
cultivated land
rough grazing land
village (each dot represents one household)
road
track
N
0
1km
Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

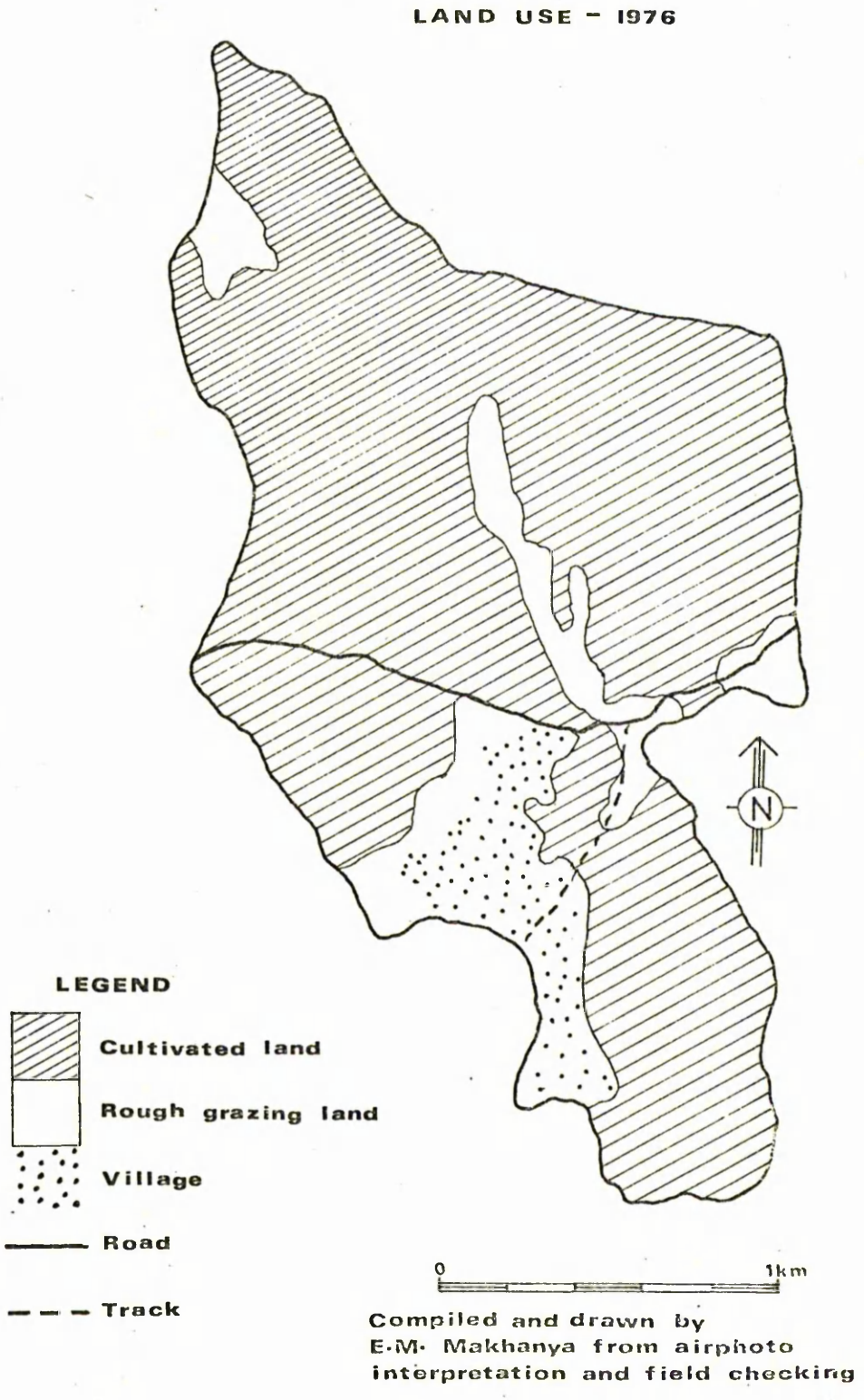
Molengoane

Fig. 4.20



Molengoane

Fig. 4.21



there was zonal differentiation in the trend of the change in the extent of cultivated land in the study area. Since it was also mentioned that the change in the extent of cultivated land was also related to change in settlements, attention will be focused on this relationship.

4.2.3.2 The relationship between settlements and the change in the extent of cultivated land

As stated in section 2.7.1 most of the settlements in the study area were the traditional clustered villages. Wherever possible the villages occupied the steeper and more rocky slopes or the edges of plateau tops that were unsuitable for cultivation. But with the increase in population the settlements have expanded and in some areas they did so at the expense of cultivated land. This was clearly illustrated in the case of Mafefoane, Musuoe Theko and Thaba Khupa (Table 4.5).

By visual comparison of Figs. 4.6, 4.7, 4.8 and 4.9 it can be seen how, in the case of Mafefoane, settlements have gradually encroached on cultivated land. The most significant displacement took place between the period 1950 and 1961 during which there was rapid development in the establishment of a university college that is now the National University of Lesotho. A total of about 45 ha of cultivated land was then affected. Between 1961 and 1976 an additional 13 ha of cultivated land was annexed to the University grounds. Accompanying the growth of the University was an expansion of the Roma mission grounds, as well as that of the villages, especially in the area of Motoko near the University. All these increases in settlements resulted in a general decrease in the extent of cultivated land.

It was obvious that many of the new settlers in the area of Mafefoane were motivated by the employment opportunities that were available there. Mafefoane was the only area in the study area that could provide a relatively wide range of paid employment, and although it was still rural in character it was zoned an urban area in 1973 (Lesotho Govt. 1973 (a)). In the questionnaire survey about 60 per cent of the respondents who were new settlers said that they had come to settle there because of the proximity to social services, such as transport, hospitals, and schools. A more detailed account of the relationship between settlements and employment and between settlements and social services will be given in chapter five.

Judging from the results reflected in Table 4.5 and by comparison with other areas in the study area, the area of Mafefoane was exceptional in the extent to which settlements had displaced cultivated land. Mafefoane exhibited traits of the urbanisation process characteristic of the urban and peri-urban areas of the less developed countries. Wherever there was any significant displacement of cultivated land by settlements in the other areas this was mainly because of relocation of the settlements.

4.2.3.3 The relationship between the relocation of settlements and the change in the extent of cultivated land

In the early history of the country (1822 to about 1870) there were continual invasions launched against Basotho by a number of enemies including, inter alia, the Matebele of Moselekatse, the Orange Free State Boers and Britain (HMSO 1930,p.2).

An account of these invasions is given in the author's M.A. thesis (1970). During the invasions Basotho occupied strategic positions on the plateau tops and hill slopes. Even after the wars were over Basotho continued to occupy the strategic positions they held during the invasions and built their homesteads on the plateau tops as well as on the slopes of the hills. These settlement sites had thus become traditional, but there were other reasons why Basotho continued to occupy them: First, since the homesteads were built of mud they were susceptible to collapse during the rainy season; the probability of this happening being higher on the plains, where the soils were more inclined to remain damp for a long time, than on the steeper hill slopes and plateau tops. Secondly, it would seem that Basotho were as early as the first two decades of the twentieth century already conscious of the limited area of arable land that was available to them and therefore had to avoid further reductions in the area of arable land by placing settlements on it (Sheddick 1954, pp.66-67).

There were a few problems created by the siting of villages on hill slopes and plateau tops. One of these problems was that of accelerated soil erosion caused by footpaths and the general depletion of the natural vegetation cover. The other problem was that the strategic advantages which the sites provided were later exploited by gangs of thieves and murderers as hiding places. Finally, many villages were relatively inaccessible and this made it difficult to provide social services and to maintain law and order. The colonial government in the early twentieth century always advocated the relocation of a village where it felt that the continued existence of the village

at its site constituted a threat to peace, or where there was a need to reclaim land that was endangered by erosion. Following the recommendations of Staples and Hudson (1938) in their report on the ecological survey of the mountain area, an official proposal to relocate villages was made in 1945. Although the report was intended for the mountain area, the proposals in it were applied also in the lowland areas. On pages 61 and 63 of his book Sheddick gives examples of villages that were resettled for the reasons given above.

The government's policy of relocating villages was given legal support by proclamation 57 of 1948 which provided for the collective punishment of villagers where a murder was committed and the criminal could not be detected.

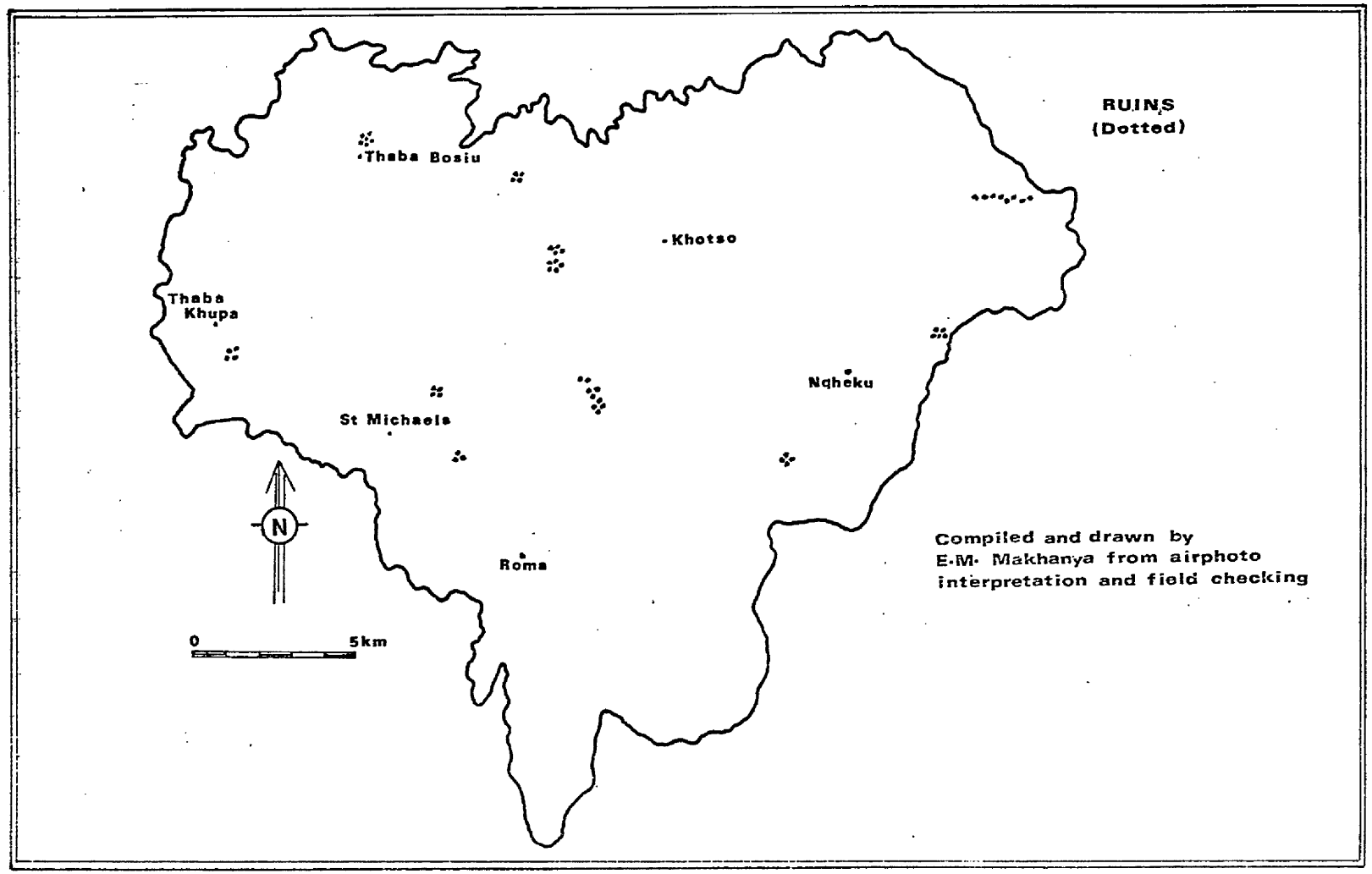
In some cases, however, homesteads were scattered and presented additional difficulties for administration. The colonial government's policy was that such scattered homesteads should be regrouped into nucleated villages. The Laws of Lerotholi contained provisions for the grouping of such villages. But while this policy was pursued, there was a reverse process taking place as a result of the traditional system of placing chiefs. "A placing may be made by a chief when he considers that it is time his son were given a place at which to live and from which he might exercise administrative control " (Sheddick 1954, pp.141-142). Normally the placing of new chiefs was accomplished by opening up new territory in which the new chief "found" a village as it were, with his followers. When most of the land suitable for occupation was already settled the placing of chiefs could be done mainly at the expense of some other existing chiefs or headmen. The system

of placing was, however, greatly curtailed by the constitutional reform of 1958 (Basutoland Govt. 1958).

In the study area there were few cases where the relocation of villages took place. But because of the controversial nature of the subject, it was difficult in many cases to obtain reliable information about the reasons why they were relocated. During photo-interpretation some of the relocated villages could be identified by remains, such as hedges and roofless buildings, as well as by the absence of footpaths and clearings around the homesteads. Other relocated groups of homesteads were discovered during field checking. Fig. 4.22 shows the areas where significant groups of homesteads were removed.

The ruins shown in Fig. 4.22 include those on the Thaba Bosiu mesa, which formed part of the homesteads used during the early invasions when Thaba Bosiu was the stronghold of Moshoeshoe I, founder of the Basotho nation. At Ntsane a whole village of about 152 people called Ntoetsi was removed to another place, Another village, Nkoti, of about 11 households was moved between 1971 and 1976 from its site near Ralejoe and the villagers were resettled at the adjacent village called Rapheko. At Ponoane all the homesteads that were situated on the slopes of the hills were removed after 1961 and resettled at the site of the main village. Similarly, many of the homesteads that were situated along the escarpment at Boinyatso and Mafefoane were resettled in various villages within the areas of the respective chiefs. There were a few other less significant examples of relocated homesteads and in some areas the process of relocation was still in progress. In the case of Samosamo near Mokhokhong (Phillipi),

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 4.22



for example, the number of homesteads in 1969 was five. By 1976 two homesteads had left the area voluntarily because of the difficulties of lack of accessibility, leaving the village with only three homesteads.

There was no evidence that the area where the villages were removed had been replaced by cultivation. This was obviously because the villages were in the first place sited on land that was not suitable for cultivation. On the other hand there were some areas where new villages or homesteads had displaced cultivated land. In the area of Mothobi, for instance, the major village was Nkhema up to the time of the 1956 population census. Between 1956 and 1961 a new village called Thoteng of about 40 homesteads was established some two kilometres away from Nkhema on what was cultivated land. A total of about 20 ha of cultivated land was displaced by the establishment of the village. The people who settled in the village came from the scattered homesteads that were situated on the slopes of the hills around the area. In the area of Musuoe Theko, Lethena did not exist on its present site in 1950 (cf. Figs. 4.10 and 4.11). It consisted of scattered homesteads on the slopes of the hills forming the eastern boundary of the study area. By 1961 there were some 30 homesteads that had displaced about 16 ha of cultivated land at the present site. In 1976 another new village of about 16 households had been established in the area of Tumahole near the mountain road. It had, however, not displaced any cultivated land.

The 36 ha of cultivated land that was displaced by the two villages was only about 0.2 per cent of the total cultivated land.

Isolated homesteads that were being built along the roads in the study area contributed to the displacement of yet another but insignificant percentage of cultivated land.

It could then be concluded that, with the exception of the area of Mafefoane, there was no significant cultivated land that was given up for settlements in the study area; there was also no evidence of areas where settlements were removed being used for the cultivation of crops. The small changes in the extent of cultivated land could not per se have affected crop production.

A phenomenon that was associated with land use in the study area was soil erosion. Much of the land classified as rough grazing land in Tables 4.2 to 4.5 was closely associated with soil erosion. Section 4.2.4 examines the relationship between soil erosion and the production of crops.

4.2.4 The relationship between soil erosion and the amount of crop production

Almost every publication on agriculture in Lesotho mentioned soil erosion as one of the major obstacles to maintaining existing levels of crop production. As far back as 1950 Corona stated that Lesotho had probably the worst erosion problem in Africa (Corona 1950, p.368). The various development plans for the territory have also rated soil conservation works among the top priorities for development, and as already stated in section 2.10 about 41 per cent of the territorial budget for the 1960 - 1964 plan was devoted to soil conservation. In the First Five Year Development Plan soil erosion was regarded as "the greatest single problem of agriculture" (Lesotho Govt. 1970 (a) p.10).

The main factors that contribute to the process of soil erosion include climate, relief, soils, overgrazing and poor cultivation methods. The relationship between these factors and soil erosion were explained under chapter two where these factors are discussed. Although a lot of effort was reported to have been put into conservation activities since the 1930's, there was very little research work done to measure the extent of erosion or to determine its rate. Table 4.7 shows the results of a survey carried out in the study area in order to determine the extent of erosion (see also Fig. 4.23).

About 95 per cent of all land in which erosion was between slight and moderate were subjected to sheet erosion, whilst in the land in which erosion was between severe and very severe only 25 per cent was subjected to sheet erosion (the rest being

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 4.23

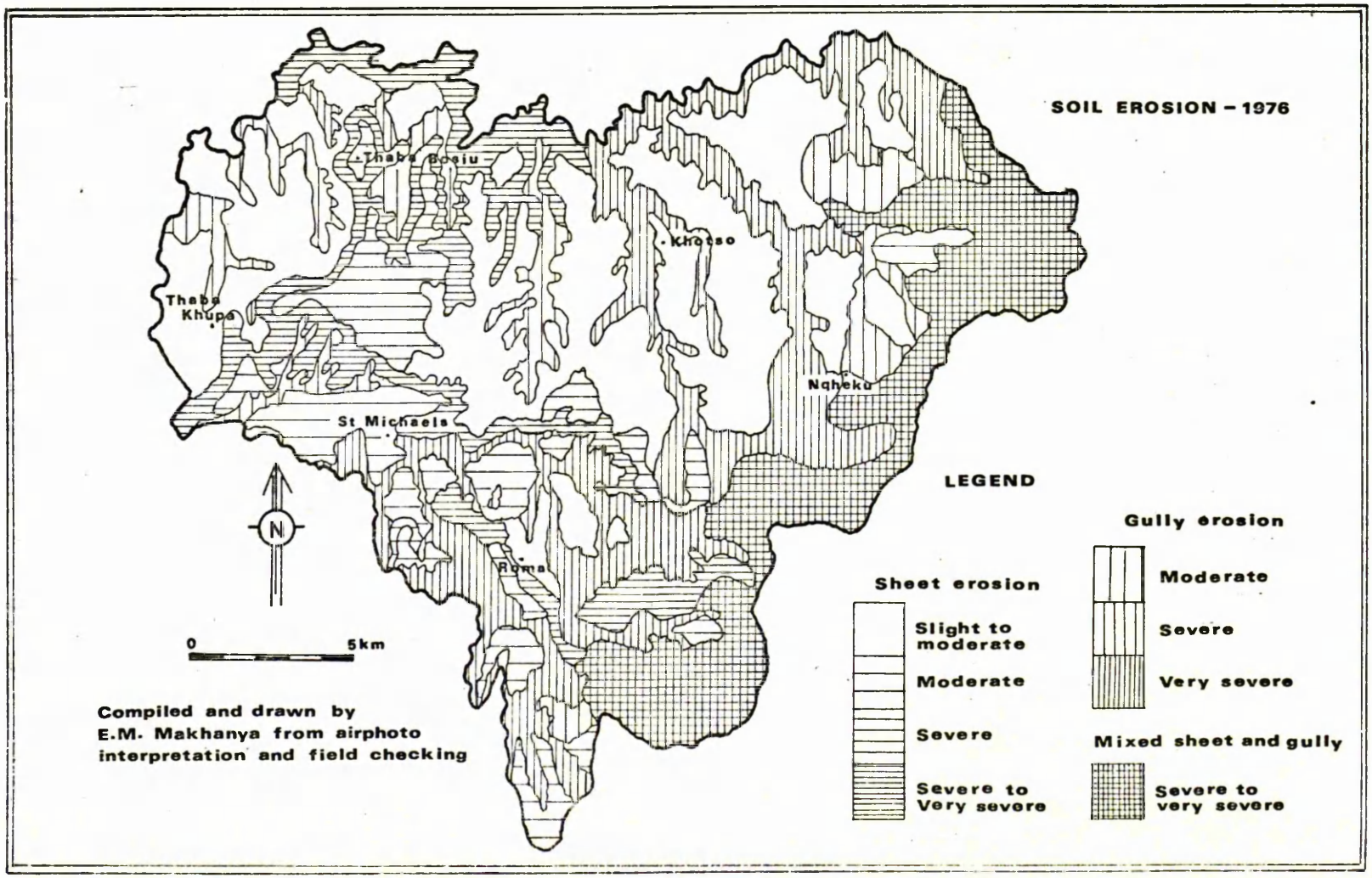


Plate 3.

Soil erosion - collapsing of a river bank near Makoili.

(Photographed by the author in 1976; printed by Paul Fox).

subjected to either gully erosion or mixed gully and sheet erosion). This showed that although sheet erosion was the more widespread type of erosion, the gully type was the more serious.

Table 4.7 Extent of erosion by class and type of erosion in the Thaba Bosiu Rural Development area - 1976

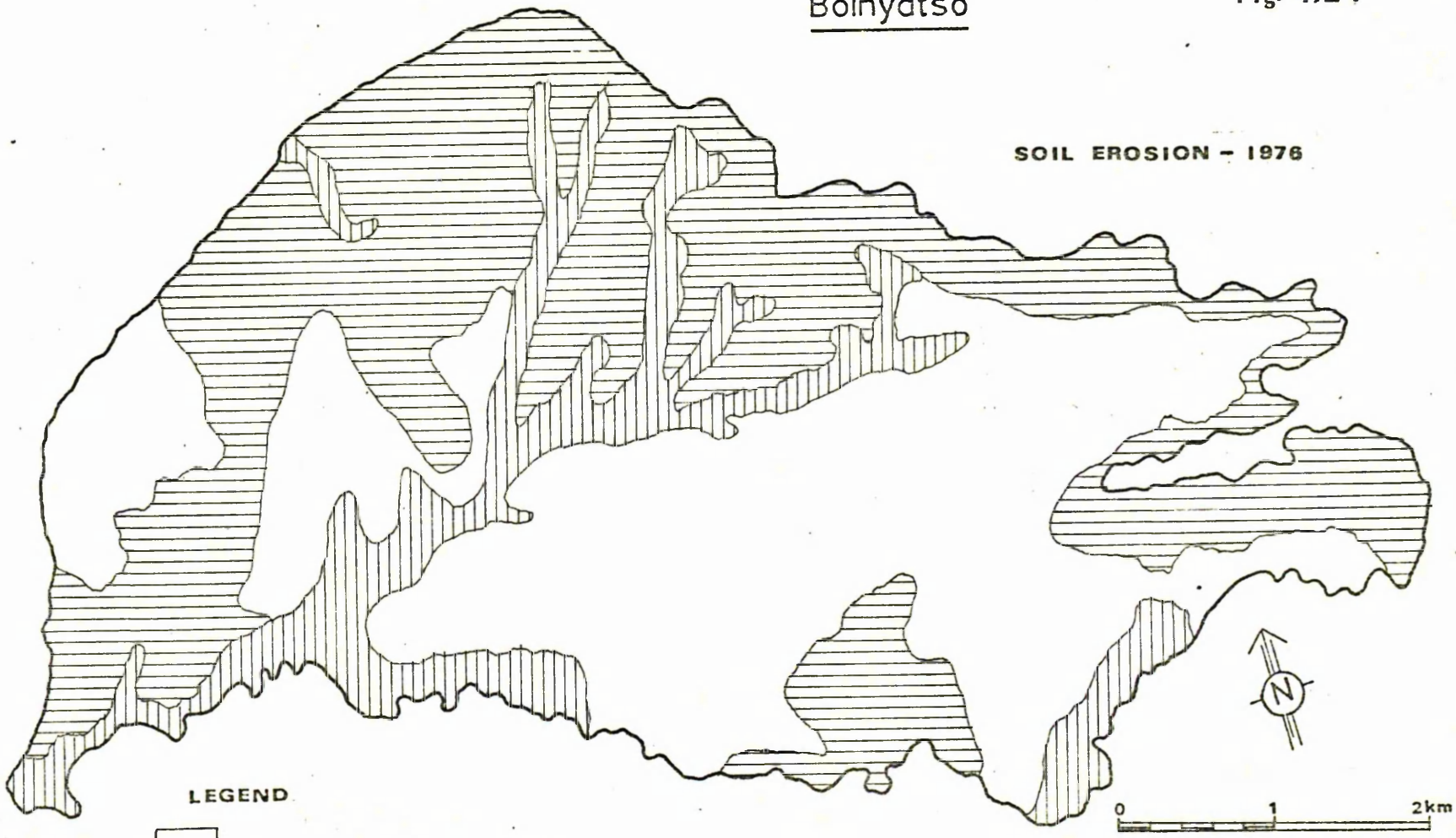
Class	Type of erosion							
	Sheet		Gully		Gully & Sheet		Total	
	ha	%	ha	%	ha	%	ha	%
Slight to moderate	12110	33	-	-	-	-	12110	33
Moderate	1470	4	560	2	-	-	2030	6
Severe	1870	5	2630	7	-	-	4500	12
Severe to very severe	3490	10	8910	24	5610	15	18010	49
Total	18940	52	12100	33	5610	15	36650	100

Source: Air photo interpretation and field checking

A closer view of soil erosion in the sampled areas (Table 4.8) shows that there were differences from area to area in the magnitude of the erosion types. Some areas were more subjected to severe sheet erosion while others were more subjected to severe gullying.

Fig. 4.24

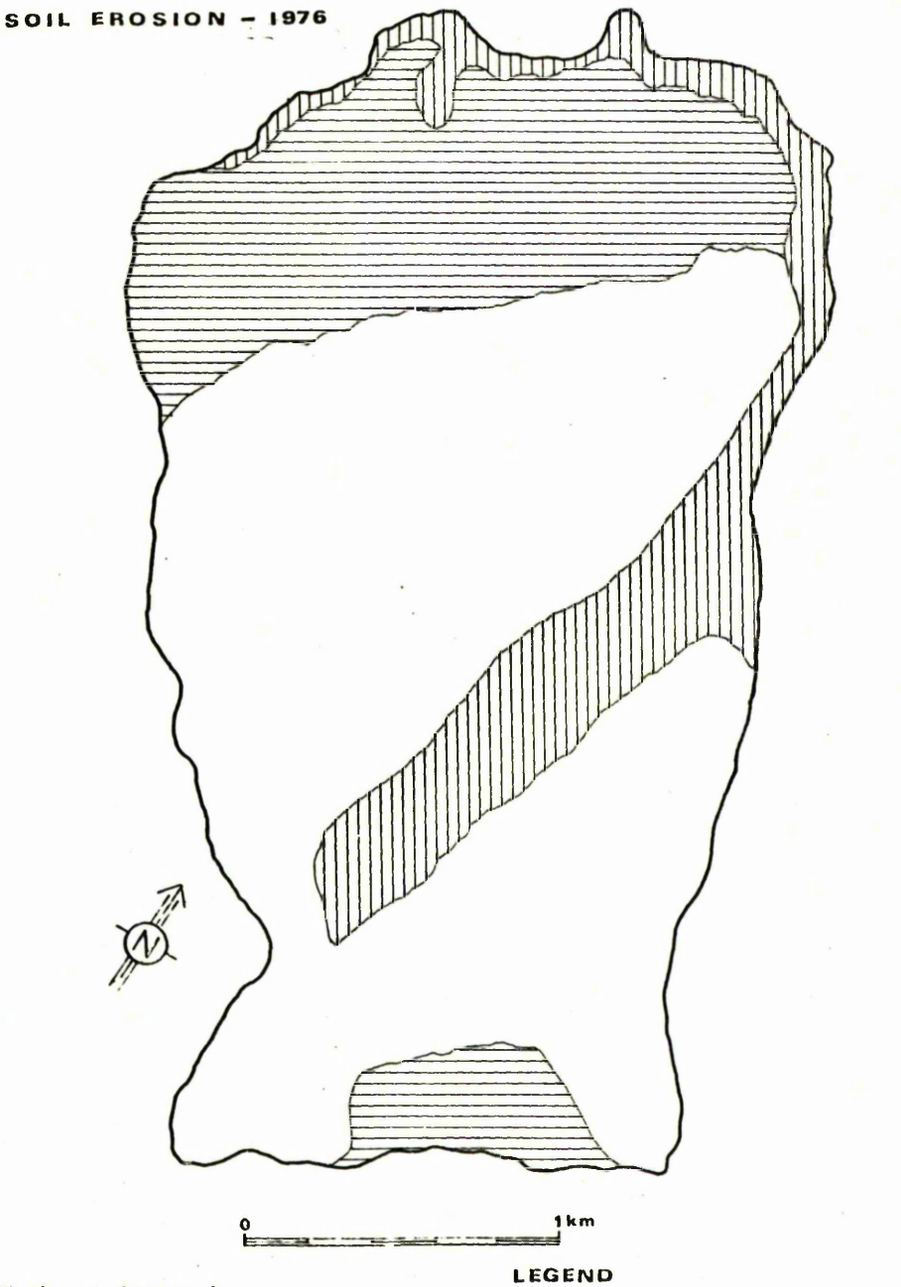
Boinyatso



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

Thaba khupa

Fig. 4.25



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

Fig. 4.26.

Ralejoe

SOIL EROSION - 1976

Legend

sheet erosion

severe

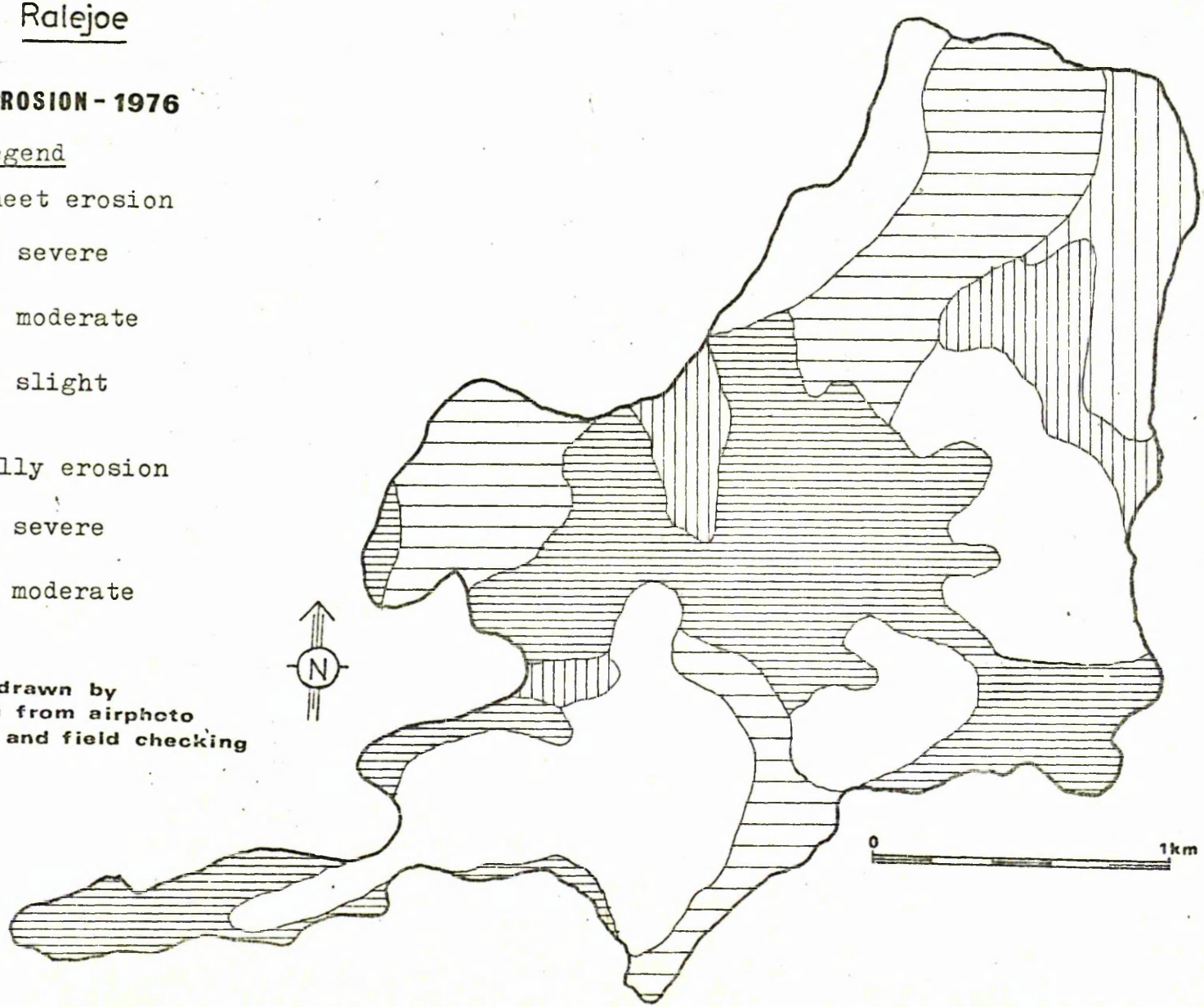
moderate

slight

gully erosion

severe

moderate



Compiled and drawn by E·M· Makhanya from airphoto interpretation and field checking

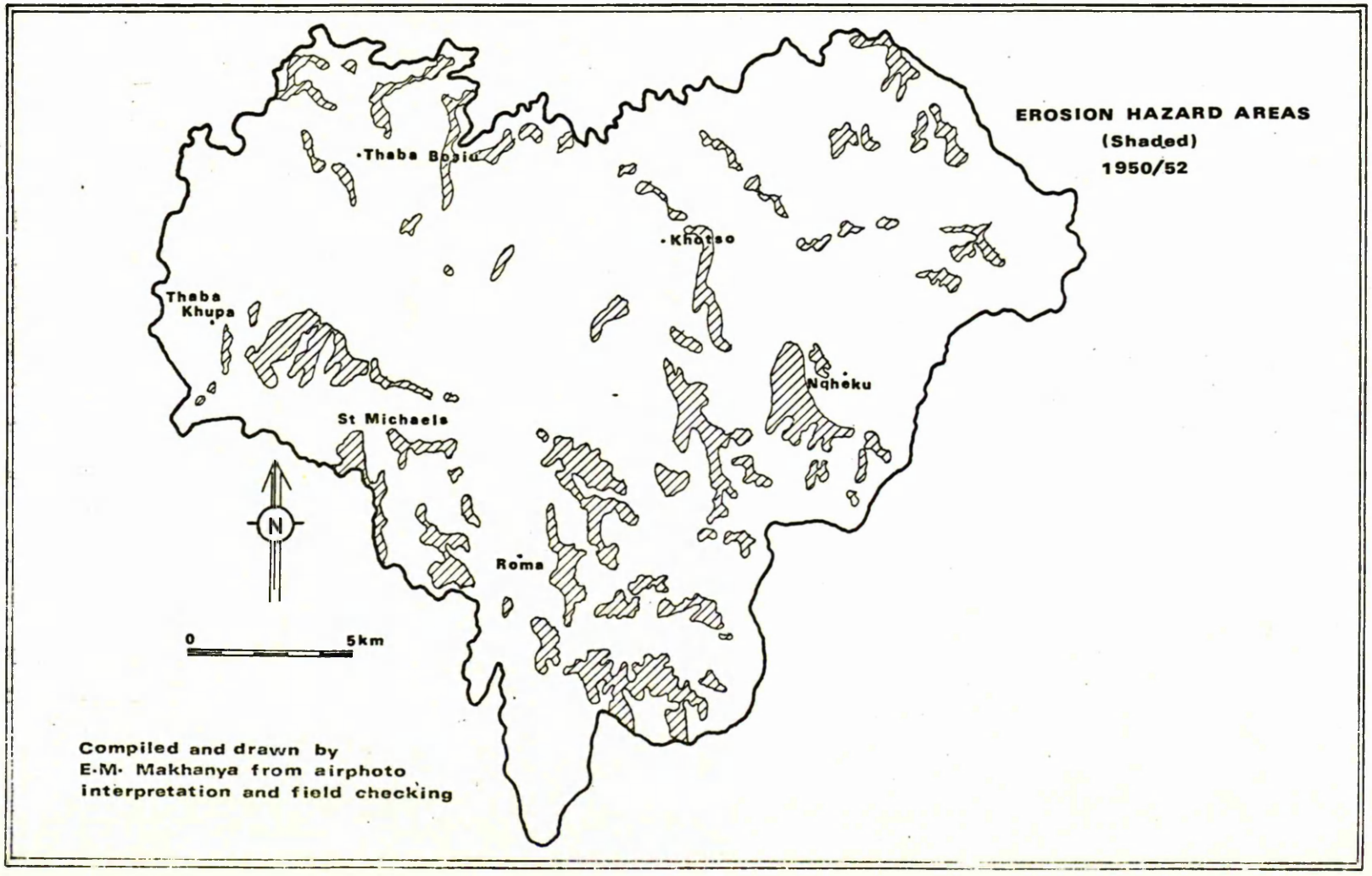
Table 4.8 Extent of erosion in the sampled areas by type 1976

Area	Severe erosion					
	Sheet erosion		Gully erosion		Total	
	ha	%	ha	%	ha	%
Boinyatso	904	36	392	15	1296	51
Mafefoane	576	34	32	2	608	36
Molengoane	17	5	60	16	77	21
Musuoe Theko	292	16	475	26	767	42
Ralejoe	171	32	42	8	213	40
Ratau	880	32	320	12	1200	44
Thaba Bosiu	929	45	338	16	1267	61
Thaba Khupa	163	25	98	15	261	40
Total	3932	32	1757	14	5689	46

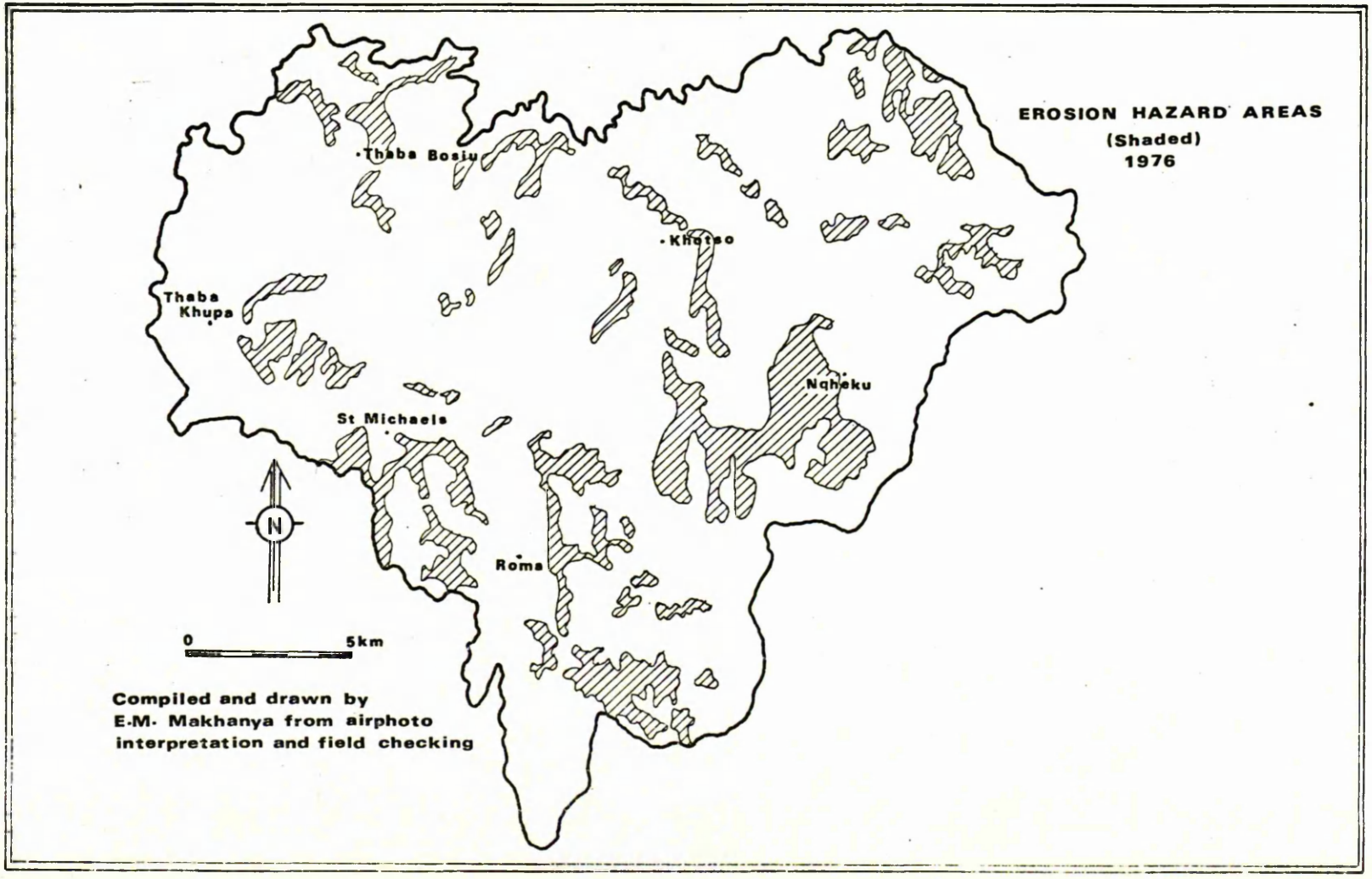
Source: Air photo interpretation and field checking

On measurement it was found that about 63 per cent of the cultivated land was on slightly or moderately eroded areas, and 37 per cent on severely eroded areas. The latter areas were regarded as hazard areas and their distribution is illustrated on Figs. 4.27 and 4.28. Areas that were not severely eroded, but that were neither cultivated nor settled were about 1152 ha, which was only three per cent of the total land of the study area. When considering the fact that the 37 per cent land cultivated on seriously eroded areas was 20 per cent of the total land of the study area, it was clear that the shortage of suitable land for cultivation was such that it had compelled people to cultivate even areas susceptible to erosion. Although the lack of past data on yields prohibits the use of a quantified comparison, it could be deduced that crop yields on these marginal areas (given the poor management found in the study area) could only be low.

Thaba Bosiu Rural Development Project Area (Area 1) Fig. 4.27



Thaba Bosiu Rural Development Project Area (Area 1) Fig. 4.28



A comparison of Figs. 4.27 and 4.28 shows that between 1950 and 1976 there was an increase in hazard areas of about 60 ha or 0.9 per cent of the cultivated land as a result of an increase in the extent of cultivated land (see section 4.2.3). This meant that although the area of cultivated land had increased between 1950 and 1976, this increase could not have brought about any significant difference in the amount of crops produced since the areas to which cultivation had been extended were not suitable for cultivation. Instead, the increase in the extent of hazard areas could only signify an increase in the phenomenon of accelerated erosion.

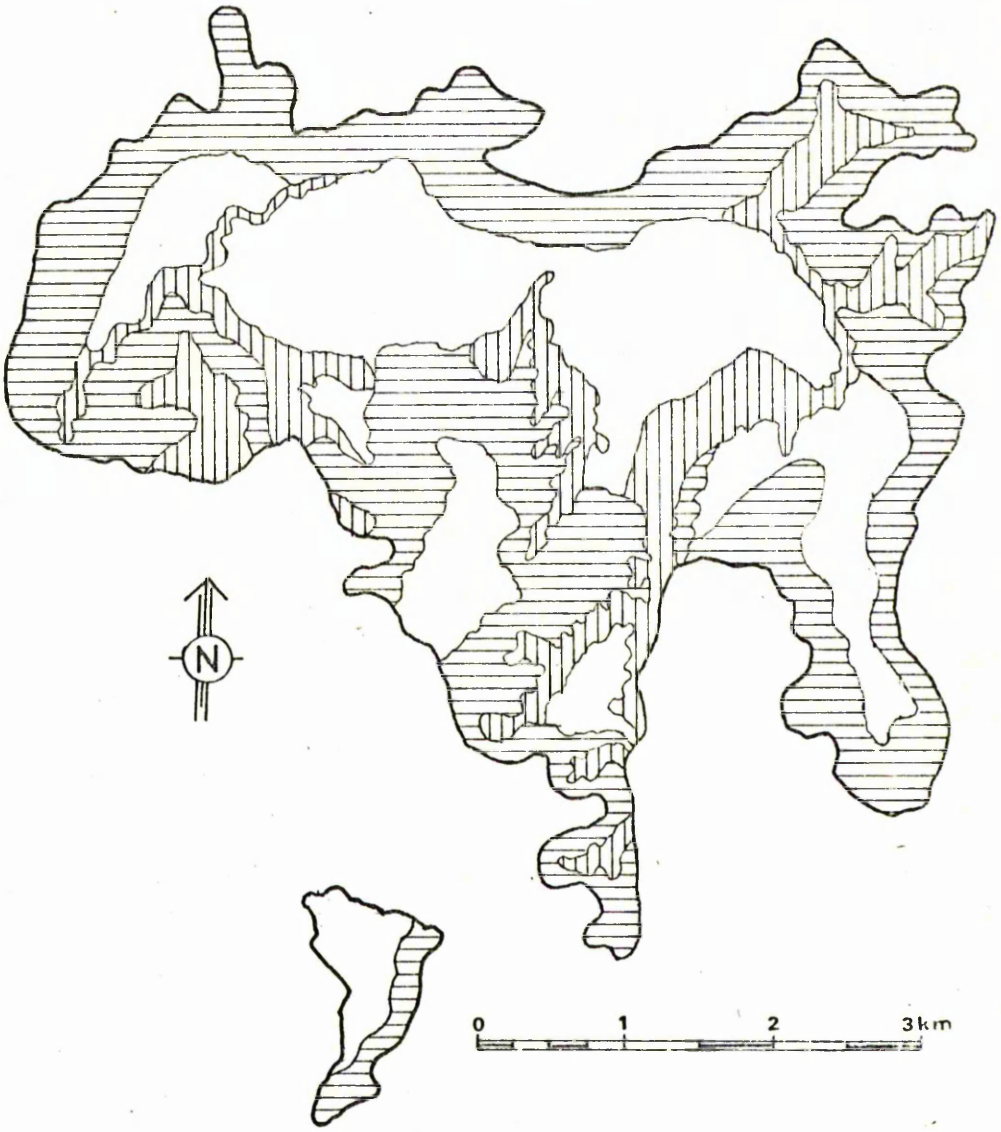
Using the 1950 and 1961 sets of photographs,it was established that there were spatial differences in the rates of erosion. It was not possible to explain this spatial difference without doing further research since there were a number of other variables involved, such as relief, soils, management, etc. to be considered. At Thaba Bosiu and Musuoe Theko there were a number of areas where significant arable lands were eroded. These could be spotted on the photographs and mapped as shown in Fig. 4.30. At Ralejoe there were two areas where the rates of erosion were so high that it could be determined by using air photographs. At A in Fig.4.31 for example, there was between 1950 and 1961 an increase of about four hectares (a rate of about 0.4 ha annual) in the erosion scar as a result of headward erosion; at B the number of gullies had increased from three to five, and at C a new erosion scar had developed.

The results of the questionnaire survey further confirmed the spatial differentiation of the soil erosion phenomenon.

Thaba Bosiu

Fig. 4.29

SOIL EROSION-1976



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

LEGEND

Slight to moderate sheet

Severe sheet

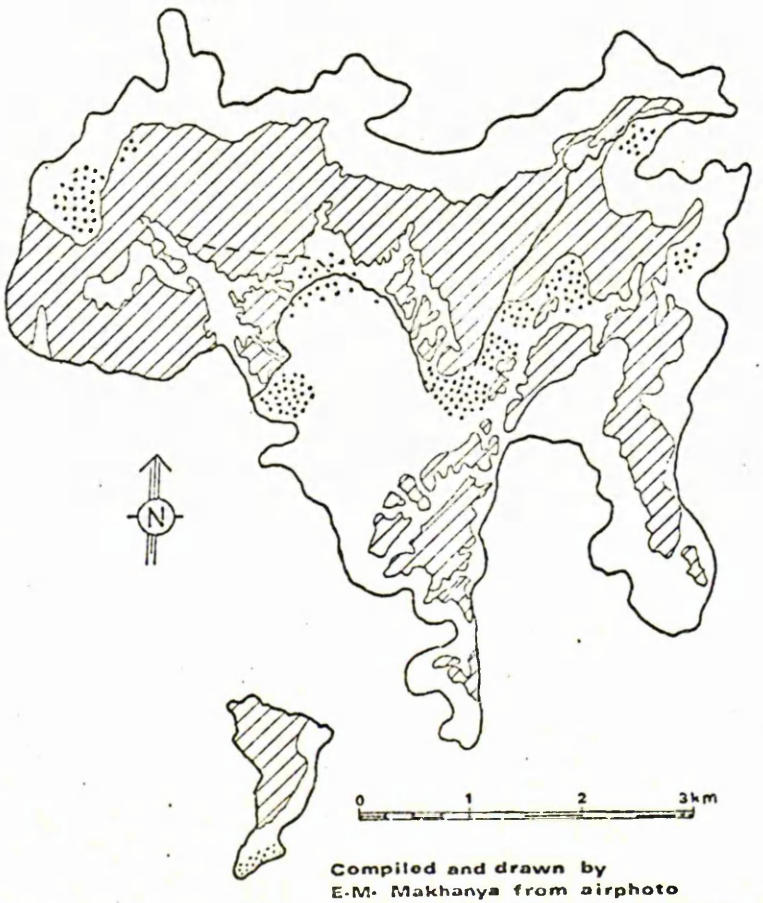
Severe gully

Thaba Bosiu

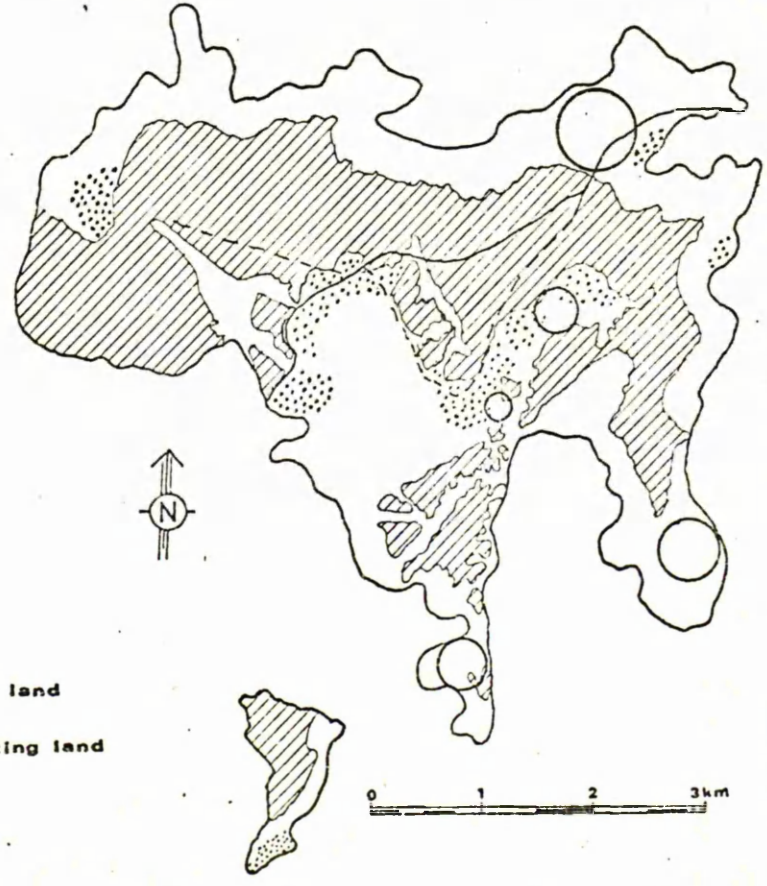
Fig. 4.30

ERODED CULTIVATED LAND 1950–1976(Ringed)

A. LAND USE – 1950



B. LAND USE – 1976



LEGEND

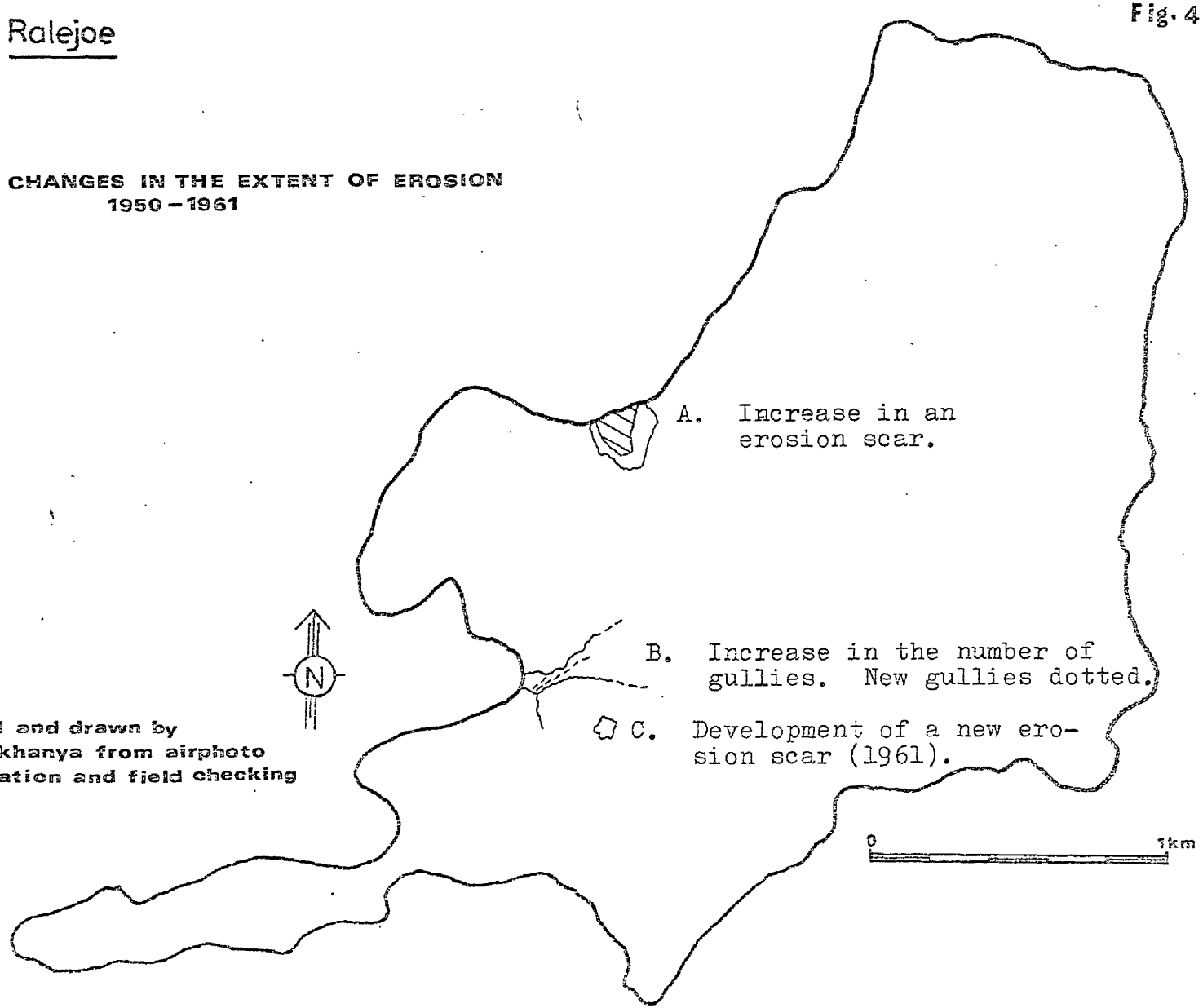
- Cultivated land
- Rough grazing land
- Village
- Road
- Track

Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

Fig. 4.31

Ralejoe

VISIBLE CHANGES IN THE EXTENT OF EROSION
1950 – 1961



Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field checking

Plate 4.

The effects of sheet erosion on cultivated land near Lebamang. Note the abandoned land at x.

(Photographed by the author in 1976; printed by Paul Fox).

There were very few respondents who reported erosion in the areas of Thaba Khupa and Ratau than in the other areas. Altogether about 60 per cent of the respondents maintained that they occasionally or continually lost soil from their fields because of erosion, and 71 per cent knew of people who have had to abandon their lands because of erosion. It could thus be said that erosion was causing considerable harm to the level of production in the study area.

4.2.5 The relationship between fallowing and fluctuations in crop production

Another factor which could have had an influence on the extent of cultivated land was fallowing. In Lesotho, however, fallowing as a method of crop rotation has not been widely practised, mainly because there has never been land to spare during the relatively short agricultural history of the territory. This has been more so in recent years as a result of the scarcity of land (land scarcity is discussed under chapter five). Fallowing was forced upon the farmers mainly by adverse weather conditions. In practice Basotho farmers planted their crops only when the first spring rains came. Should these planting rains not come in time, planting will be delayed. As already stated it has been common for the first rains to be delayed until about December when it was too late to do any planting of the grain crops. On such occasions many farmers would not attempt to do any planting, with the result that many fields would be left fallow. Sheddick, who appropriately called this "enforced fallows" thought this practice to be part of the explanation of the continued productiveness of the lowland fields which he regarded as having deficient soils (Sheddick 1954, p.76). Sheddick stated that another reason for fallowing in Lesotho was that Basotho suffered from a shortage of oxen to work the fields. While it was true that not every family had oxen to work the fields, it would be rather an overstatement to refer to shortage of oxen *per se* as a factor in fallowing. Basotho have always been communal in their living as evidenced by traditional practices such as *Mafisa* (contract for the loan of livestock) and *Letsema* (explained under

section 2.14.4). However, ever since the money economy was introduced into the territory these traditional practices have become gradually adapted to the monetary system and now involve some cash. Hence the real problem was shortage of money rather than shortage of oxen or labour.

During the questionnaire survey about 32 per cent of the respondent households in the sample areas reported fallow fields. With the exception of one household, that fallowed because of low returns, all the households gave lack of means as reason for fallowing. In her study of the Matsoseng village Wallman (1969) found that 25 per cent of the fields were fallowed and that the reason for fallowing was mainly the lack of means.

Figures from the agricultural censa show the percentage of fallowed land to total cultivated land to have been 22 per cent in 1950, 8.6 per cent in 1960, and 10.4 per cent in 1970. Since the data were not sufficiently large, it was difficult to establish any valid relationship between fallowing and the fluctuations in crop production; but it was logical that, all other things being equal, the amount of crops produced will vary with the amount of land fallowed.

4.2.6 The relationship between land tenure and crop production

One of the most important factors in land management was land tenure, and in this section the role played by land tenure in agricultural production in the study area will be reviewed. The land tenure practices of Lesotho have been discussed under section 2.12. What follows is an examination of the extent to which the system of land tenure influenced crop production.

Writers such as Sheddick (1954), Quirion (1958), Henry (1964), Wallman (1969), Stevens (1970), Cowen(1967), Williams(1972), and Hamnett (1973) have referred to the effects of Lesotho's land tenure on agricultural productivity. Their works were written at different historical periods starting with Sheddick's work in 1954 to Hamnett's in 1973. Their interests were also varied in that some were sociologists while others were economists. There was thus a wealth of information contained in their combined works on the land tenure system in Lesotho.

On closer examination of the works of some of these writers, however, one perceived that there were a number of misconceptions that arose apparently from the failure on the part of the writers to appreciate the unique and subtle traditional, socio-economic and philosophical principles behind the system of land tenure in Lesotho. Bohannan, who maintained that cultural differences could influence attitudes towards land, stated that "thinking about land has been and remains largely ethnocentric" (Bohannan 1963, p.101). The difficulty experienced by foreigners in comprehending the subtleties of the land tenure system in Lesotho was expressed by Palmer(1970, pp.16-17) in his writing on the

application of the Roman Dutch Law in Lesotho. He pointed out that Basotho were ". . . a people whose social relations reflect a stronger sense of community and individual inter-dependence, who have no commercial or industrial past and to whom land is the nation's greatest asset. The ownership of land as it is normally known at civil law is strange and inadequate".

Quirion seemed to have based his writing almost entirely on the general principles of communal land tenure as outlined in Clauson's (1953) publication, apparently without having inquired about their applicability to Lesotho. Henry (1964) and Williams (1972) have both echoed Sheddick's (1954) ideas without considering the amount of change that had taken place between Sheddick's time of writing and theirs. Sheddick's work is itself a valuable historical record of the situation in Lesotho, although its value as a record book is marred by his frequent expression of opinions that often clouded the true position.

When discussing the land tenure of Lesotho it is necessary to bear in mind the following:

(a) That, as outlined in chapter two, the principle of inalienability of land in Lesotho evolved from the experiences of the pre-colonial period during which there were a number of land disputes that arose from misunderstanding between Basotho's concept of communal land tenure and the concept of land ownership held by the white settlers whom Moshoeshoe allowed to sojourn in what he regarded as his territory.

(b) That the initial object of the land tenure in Lesotho

was production for subsistence, and that the principle of equity in the allocation of land was sine qua non to this object.

(c) That the level of economic development in Lesotho was still so low that subsistence agriculture still played an important role in the livelihood of over 80 per cent of the population (see sections 2.6 to 2.11).

(d) That the physical environment of Lesotho, as already shown, was very harsh on crop production and that it would require high capital investment to overcome its adverse effects on agricultural production.

(e) That the land tenure system of Lesotho has not been very rigid. Adjustments and adaptations have continually been made to meet new social, political and economic conditions as shown in section 2.12.3.

(f) That the system of migrant labour characteristic of the rural areas did not provide any security for the migrants. The majority earned so little that they could hardly engage in investments, and they had such short contracts (six to 18 months at a time for those who worked at the mines in the Republic of South Africa) that they could not plan for the future. Moreover, the migrants who worked in the Republic of South Africa (i.e. over 75 per cent of all migrants) had very little chance of becoming permanent settlers at their places of work. Hence it was inevitable that the migrants retained their agricultural holdings as a means of providing social and economic security.

The position of Basotho peasant farmers can best be summarized in the words of Yudelman: "Peasants rarely have anything other than land and labor whereby to sustain themselves.

Without capital, with limited mobility and few alternative opportunities for making a livelihood, they are tied to the land; threats to their position vis-à-vis the land are threats to their security" (Yudelman 1964, p.57).

Failure to appreciate the above points has led to the divergent opinions held by the different writers on the subject. These include Steven's (1970) opinion that the system of land tenure in Lesotho was workable as opposed to the opinion held by Williams (1972) that it was completely at fault; Sheddick's (1954) view that there was no shortage of land in Lesotho as opposed to Hamnett's (1973) view that there was land shortage.

The merits and demerits of the land tenure system, as far as crop production was concerned, could be better assessed by examinimg the institutional arrangements related to crop production that were a direct or indirect result of the system. The following are worth considering: (a) farm size (b) fragmentation (c) cropping pattern (d) communal grazing (e) share-cropping and (f) security of tenure.

4.2.7 The relationship between farm size and the low and fluctuating production in crops

Although farms ranged in size from zero to about eight hectares in Lesotho, the mode in 1970 was two hectares. The agricultural surveys carried out in 1950, 1960 and 1970 show that the average farm size has been progressively decreasing (see Table 4.9). The reason for the decrease in farm size was to be found in the fact that fewer fields than the traditional three have been allocated in the later years as a result of the shortage in land. The increase in the number of land holdings shown in Table 2.4 was evidence of the fact that new allocations of land were made; since land was inelastic in areal terms, the new allocations were made at the expense of the average size of the holdings.

Table 4.9 Average size of land holdings (ha) in Lesotho by zone

Zone	1950	1960	1970
Lowland	2.9	2.8	2.4
Foothill	1.6	1.6	1.6
Mountain	2.3	2.0	1.7
Orange River Valley	2.3	2.1	1.7
Total	2.5	2.2	2.0

Source: Monyake, L.B. p.63

The results of the questionnaire survey in the sampled areas showed that the average farm size in 1976 was 1.7 ha, which was slightly less than the 1970 figure for the territory. The question of whether the average farm size of 1.7 ha in Lesotho was economically viable or not has raised a lot of argument

Table 4.10 Percent distribution of total cropland by size of holding - 1960

	All holdings	Hectares										
		<1	1 - 2	2 - 5	5 -10	10-20	20-50	50-100	100-200	200-500	500-1000	1000+
Africa	100.0	4.3	6.4	13.1	10.2	8.0	7.0	3.5	3.3	11.7	11.2	21.3
Kenya	100.0	3.9	9.5	18.6	11.6	11.2	0.2	0.6	1.6	9.8	10.5	22.5
Lesotho	100.0	8.8	19.0	49.6	16.7	4.6	1.3	-	-	-	-	-
Libya	100.0	0.2	0.4	2.3	5.2	11.9	26.0	17.4	14.1	22.5	-	-
Malagasy	100.0	30.0	33.3	29.3	7.4	-	-	-	-	-	-	-
Mali	100.0	1.8	6.2	29.7	29.4	20.8	5.9	6.2	-	-	-	-
Morocco	100.0	7.0	9.3	26.2	24.3	17.3	15.9	-	-	-	-	-
Portuguese Guinea	100.0	3.1	15.0	44.3	21.5	12.9	3.2	-	-	-	-	-
Senegal	100.0	3.1	8.9	31.2	30.7	26.1	-	-	-	-	-	-
Seychelles	100.0	-	-	-	2.5	9.5	14.4	15.9	20.0	22.9	10.1	4.7
South Africa	100.0	-	-	0.1	0.2	0.4	1.2	1.7	4.8	22.3	25.7	43.6
South West Africa	100.0	-	-	-	-	-	-	0.1	0.1	0.1	0.2	99.5
Togo	100.0	6.3	14.8	35.8	26.3	11.2	5.6	-	-	-	-	-
United Arab Republic	100.0	16.1	21.6	22.7	11.1	8.3	8.8	11.4	-	-	-	-

Source: FAO, 1971

(Williams 1972, pp.13-15), and one way of clarifying the issue would be to compare the average farm size in Lesotho with that of other countries.

In comparison with western countries such as England where the average farm size was 100 acres or 40.5 ha (Stamp 1969, p.123), or the Netherlands where the modern standard farm was 24 ha (Chisholm 1968, p.122), the average farm size in the study area looked ridiculous. A comparison of the average farm size in Lesotho with that in other African countries shows Lesotho to have had smaller farms than average for the continent in 1960 (Table 4.10). Table 4.10 shows, for example, that whereas an average of 51 per cent of the farms in Africa were above 50 ha in size, there were no recorded cases of farms of this size in Lesotho. The mode (about 49.6 per cent of the farms) in Lesotho was the two to five hectare size group. In fact, among the countries listed in Table 4.10, Lesotho was second only to Malagasy as far as the prevalence of small farms was concerned. In chapter five it will be demonstrated that at the prevailing level of production, and given the type of crops raised, the average farm in Lesotho did not produce enough income to support an average rural household. However, as it is demonstrated in Table 4.11 that there was no significant correlation between crop yield and farm size, it could be concluded that the size of the farms as such did not have a marked influence on crop yields.

Table 4.11 Crop yields in Lesotho by size of holding, 1960 (100 kg/ha)

Size (ha)	Rank	Maize	Rank	Sorghum	Rank	Wheat	Rank
0.0 - 0.8	10	3.5	3	3.3	6	4.1	2
0.9 - 1.6	9	3.7	2	3.9	2	3.9	3
1.7 - 2.4	8	3.1	5.5	3.2	7	3.3	6
2.5 - 3.2	7	3.4	4	3.4	5	3.6	4.5
3.3 - 4.0	6	3.1	5.5	3.5	4	3.6	4.5
4.1 - 6.1	5	3.0	7.5	3.1	8	2.9	8.5
6.2 - 8.1	4	2.9	9.5	3.0	9	2.6	8.5
8.2 - 12.1	3	2.9	9.5	3.6	3	3.0	7
12.2 - 16.2	2	3.0	7.5	4.5	1	4.3	1
16.3 +	1	4.5	1	-		0.8	10
Rank correlation			-0.28		0.09		-0.47
Significance level (one tailed test)			> 0.05		> 0.05		> 0.05

Data source: Morojele 1965, part 4, p.64

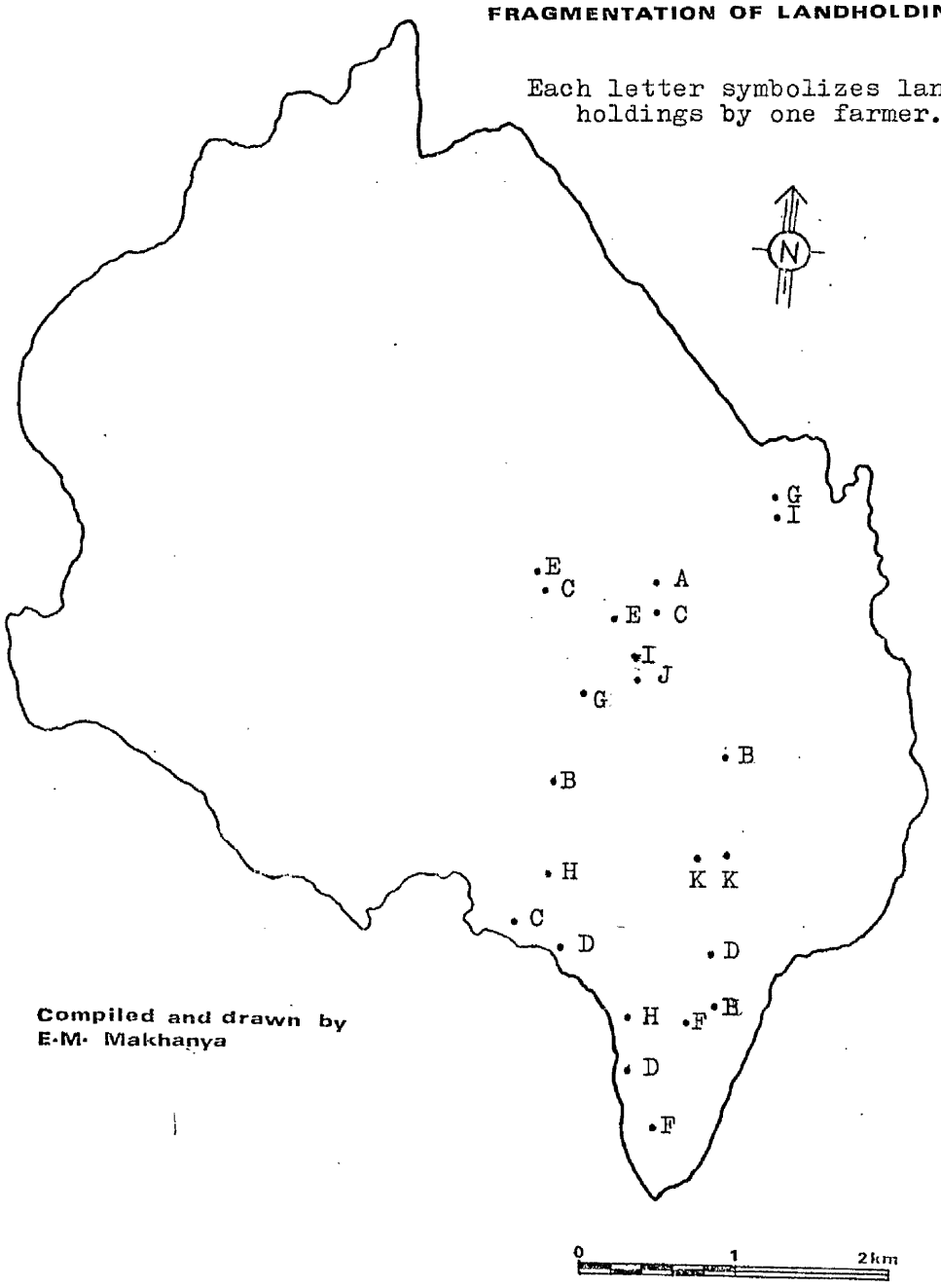
4.2.8 The relationship between fragmentation and the low and fluctuating production in crops

It was pointed out in section 2.13.2 that fragmentation of the land holdings in Lesotho resulted partly from the traditional principle of ensuring equitable distribution of land in relation to physical conditions influencing crop production, and partly from the shortage of land. Since no data were available about the numbers of farms falling under each of the two categories, it was not easy to say how efficient fragmentation was in providing insurance against adverse physical conditions such as soil or rainfall (Dixon 1975, found that in the Korat plateau of north east Thailand fragmentation did provide insurance against adverse rainfall conditions). For the same reason measurements of fragmentation in terms of mathematical formulae such as Igbozurike's (1974) relative index of land parcellation, in order to determine its efficiency, may not be applied.

About 72 per cent of the farms in the study area were fragmented. A spot check on two of the areas (Figs.4.32 and 4.33) illustrated the magnitude of the phenomenon. The average distance between field and village was about 1.2 km; which meant that a farmer with the average of two fields, and who had to give daily attention to both, travelled about 4.8 km per day (depending on distance between the fields and on their relative location). Assuming that fragmentation did not offer any benefits of insurance against adverse physical conditions, the increased distances resulting from it obviously demanded extra time and energy (the majority of the farmers walked to their fields) and consequently reduced the productivity of the farmers. According to the officers of the Khomokhoana project, about 30 per cent of the

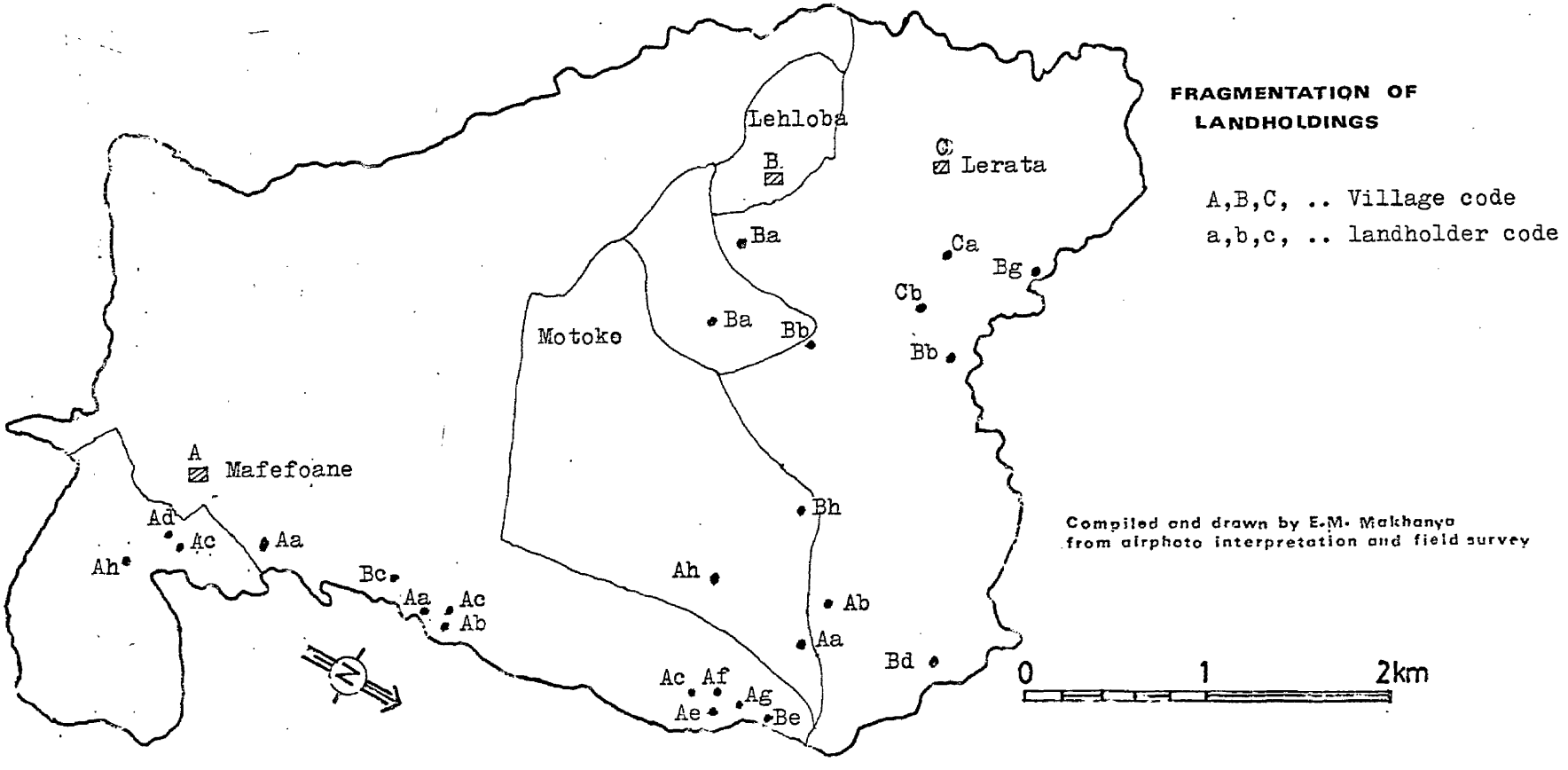
Ratau

Fig. 4.32



The area of Mafefoane

Fig. 4.33



farmers' time was wasted through movement from field to field. In the same way fragmentation also caused inconvenience to mechanisation. But fragmentation as such, had nothing to do with the fluctuating production in crops since it was a constant phenomenon. It was also fortunate that, unlike the position in some countries where communal land tenure was practised, fragmentation in Lesotho did not result from the sub-division of land parcels according to laws of inheritance which would have proliferated the phenomenon.

As a result of fragmentation the average size of each land parcel in the study area was about 0.8 ha. The economic implications of producing the different crops at subsistence level on it are shown in Table 4.12. For the sake of convenience the

Table 4.12 Economic implications of producing field crops at subsistence level on a one hectare land parcel at 1974 prices

Crop	Yield 1970 (100 kg/ha)	Input cost (Rands)	Output value (Rands)	Gross margin (Rands)
Maize	5.8	12	23.2	11.2
Sorghum	7.0	12	28.0	16.0
Wheat	5.4	12	32.7	20.7
Beans	2.2	15	65.8	50.8
Peas	4.0[x]	15	60.0[x]	45.0[x]

x estimate

Input cost = ox ploughing plus seed

Data source: 1. 1970 agricultural census
2. Farm management and production economics report.

average size of land parcel was assumed to be one hectare.

Table 4.12 also assumed that the farmer could not provide his own

oxen for ploughing. In chapter five it will be demonstrated that at this rate of production the average farm, let alone the average land parcel, did not produce enough income for an average rural household.

Assuming optimum yield (highest yielding varieties obtained at the agricultural experimental stations in Lesotho) was obtained, the economic analysis shows that gross margin could be increased by up to 13 times per harvest (Table 4.13).

Table 4.13 Economic implications of producing field crops at the optimum level on a one hectare land parcel at the 1974 prices

Crop	Yield 1976 (100 kg/ha)	Input cost (Rands)	Output value (Rands)	Gross margin (Rands)
Maize	42.1	40.0	189.5	149.5
Sorghum	34.1	40.0	153.5	113.5
Wheat	40.1[x]	40.0	242.6[x]	202.6[x]
Beans	21.7	45.0	648.8	603.8

x estimate

Input cost = tractor ploughing plus seed, plus fertilizer

Data source: 1. Ministry of Agriculture, Maseru
2. Farm management and production economics report

The figures obtained at the experimental stations were, however, not a good yardstick since they resulted from a long period of experimentation by agricultural experts working under ideal conditions and on plots of only about 100 m^2. It was very doubtful that the average farmer in Lesotho would be able to reach this level of production in the near future.

As already pointed out, different factors acted jointly and in a complex manner in their influence on crop production, and it was difficult to assess the effect of any one of these in isolation. This was particularly true of fragmentation. It could, however, be stated that the fragmented nature of the land holdings in Lesotho hampered mechanisation because it was not economic to use machines on small and scattered land holdings.

4.2.9 The relationship between cropping pattern and the low and fluctuating production in crops

In section 4.1 it was shown that there was a gradual swing from the raising of subsistence crops towards the raising of cash crops in Lesotho in the period 1950 to 1970. In the study area it was found that the swing was towards the raising of beans. Table 4.14 shows that beans were the most widely cultivated crop in 1975/76, especially at Mafefoane, Musuoe Theko, Ralejoe and Ratau. The fact that about 90 per cent of the people raised beans at Ratau was not surprising, since this was the area where conservation work had already been introduced when the survey was undertaken, and the project had recommended the raising of beans for that year. Beans were found to be even more popular than the traditional maize crop and this should indicate that the idea of raising cash crops had been adopted by many of the farmers.

Table 4.14 Percentage households that raised the different crops in 1975/76

Area	Maize	Sorghum	Wheat	Beans	Peas
Boinyatso	56.5	39.1	—	47.8	—
Mafefoane	52.4	57.1	4.8	76.1	—
Molengoane	50.0	43.8	—	43.8	12.5
Musuoe Theko	63.6	—	—	81.8	90.9
Ralejoe	60.0	40.0	—	80.0	20.0
Ratau	50.0	12.5	—	90.0	—
Thaba Bosiu	90.0	40.0	—	31.3	—
Thaba Khupa	80.0	60.0	—	60.0	20.0

Source: Questionnaire survey conducted by the author in 1976

As pointed out in section 4.2.5 a farmer's decision to plant in the study area depended on the very erratic rainfall and

scarce means. Since the acquisition of seed was one of the determinant means, the rotation of crops among most farmers was a matter of chance,in that the farmer planted the crop for which he obtained seed. As there was further such a limited variety of field crops, crop rotation was not practised on a scientific basis. This tendency to practise monocropping was partly responsible for the soil fertility depletion and low yields.

Double cropping was encouraged by the department of agriculture, but the results of the questionnaire survey showed that only about 14 per cent of the farmers double cropped. About 94 per cent of those who did practise double cropping raised peas as the winter crop (see Table 4.14). Many farmers claimed that they did not raise wheat because of the many enemies that the crop had. These included livestock, birds and pests; but since birds and pests were enemies to all other crops, the real enemy was livestock. In the study area wheat was raised as a winter crop, that is, during the time when the fields were open to common grazing. Since there was no fencing, anyone raising a winter crop would have to keep a constant eye on it so as to prevent livestock from destroying it. This also explained why peas were also not popular. But it was established that the practice of double cropping was carried out with success in some areas where the communities had by consensus agreed to it. It was only in those areas where many people did not agree to the raising of winter crops, or where the chief was apathetic to it, that there were problems. Hence, at Musuoe Theko 90.9 per cent of the households raised peas as opposed to none at four of the other areas (Table 4.14). It could be concluded that there was lack of systematic cropping in the study area caused, among other

factors, by the farmers' lack of money and the practice of communal grazing. Unsystematic cropping in turn contributed to the low and fluctuating production in crops. The practice of communal grazing needed more attention since it was so closely related to the raising of crops in Lesotho.

4.2.10 The relationship between communal grazing and the low and fluctuating production in crops

Communal grazing was discussed in section 2.13.3. Although the Laws of Lerotholi made provision for the control of the movement of livestock, there were no restrictions on the numbers of livestock an individual might keep. Efforts by the department of agriculture to introduce restrictions on numbers were thwarted by the fact that every farmer was entitled to have access to communal grazing, so that even if everyone was restricted to a certain number of livestock units, there could still have been over-grazing in some areas simply because the numbers of the farmers themselves were already too large. It was therefore very difficult to control soil erosion and to increase production in crops under this communal grazing arrangement.

Many farmers, however, expressed reluctance to raise livestock partly because of theft and partly because of the fact that livestock died during the droughts, and it was difficult for many farmers to raise money to replace them. This would explain in part the fact that fewer households kept sheep and goats, and many preferred pigs (Table 4.15). Horses and donkeys were used mainly for transportation, and it was found that those who used them kept only one or two. Stock theft and droughts have, therefore, acted as checks against overstocking, yet they were part of the obstructions against progress in livestock raising.

The density of livestock units in the study area was calculated to be about 0.36 per ha or 36 per km^2. During the summer cropping season the density of livestock on grazing land

Plate 5.

Grazing on the stubble near Thaba Khupa.

(Photographed by the author in 1976; printed by Paul Fox).

was about 0.67 per ha or 67 per km^2. Considering the low carrying capacity of the land and the fact that livestock depended solely on rough grazing, this number was high.

Table 4.15 Percentage households with the different livestock in the sampled areas - 1976

Area	Cattle	Sheep	Goats	Horses	Donkeys	Pigs
Boinyatso	21.7	4.3	4.3	13.0	4.3	43.5
Mafefoane	47.6	19.0	19.0	33.3	19.0	66.7
Molengoane	31.3	25.0	12.5	31.3	18.8	43.8
Musuoe Theko	81.8	9.1	—	18.2	36.4	36.4
Ralejoe	20.0	—	—	40.0	40.0	40.0
Ratau	56.3	—	—	18.8	12.5	50.0
Thaba Bosiu	40.0	10.0	—	20.0	20.0	50.0
Thaba Khupa	80.0	20.0	20.0	60.0	60.0	80.0
Total	43.9	11.2	7.5	23.4	19.6	50.5

Source: Questionnaire survey conducted by the author in 1976

Table 4.16 Densities of livestock and livestock units* in the study area - 1974

Density criterion	Cattle per ha	Sheep per ha	Goats per ha	Stock units per ha
Study area	0.26	0.20	0.27	0.36
Grazing land	0.49	0.37	0.51	0.67
Cultivated land	0.59	0.45	0.60	0.80
Household	1.83	1.39	1.88	2.49

* livestock unit = animal of $\pm$ 800 lbs (364 kg) = 1 cow = 5 sheep or goats

Source: 1. 1974 prelisting (TBRDP)
2. Air photo interpretation and field checking

Assuming that all livestock took part in stubble grazing during

the winter communal grazing, the density of livestock units on cultivated land was calculated to be about 0.80 per ha or 80 per km^2. This high density of livestock units on cultivated land caused accelerated erosion and thereby reduced the fertility of the soils which in turn resulted in low yields. In section 4.2.9 it was also shown how communal grazing was negative to productivity in crop raising by preventing many farmers from raising winter crops. Communalism was, however, a characteristic feature of rural Basotho and is also reflected in many other socio-economic activities. One of these was the system of share-cropping, which was alleged to be partly responsible for the low yield in crops.

4.2.11 The relationship between share-cropping and the low and fluctuating production in crops

On examining share-cropping in Lesotho, it should be borne in mind that the practice was quite different from that encountered in some of the under developed countries where there was a landlord-tenant relationship that involved fixed rent. In Lesotho share-cropping involved the sharing of the harvest obtained by the contracting parties. It was a joint venture in the production of crops, and each of the contracting parties contributed something towards it, namely, land, seed, labour, oxen or farm equipment in any combination.

According to the Agricultural Census of 1970, about 25,253 households or 13.47 per cent of the total of the contributions made by the contracting partners are shown in Table 4.17.

Table 4.17 Number of households reporting share-cropping in Lesotho by type of contribution made by partners and by size of farm

Farm size (ha)	No. of HH	Type of contribution made by partner			
		Oxen	Seed	Labour	Farm equipment
Under 0.8	3062	2537	2114	2664	2705
0.9 - 1.6	6952	6060	4821	6645	5784
1.7 - 2.4	5404	4117	4124	4817	4216
2.5 - 3.2	3442	2793	2480	3014	3161
3.3 - 4.0	3028	2269	1819	2637	2527
4.1 - 6.1	2120	1821	1407	1653	1737
6.2 +	1245	766	590	1055	1004
Total	25253	20363	17355	22485	21134

Source: 1970 Agricultural Census

In the areas sampled for this study, it was found that a total of

about 55.1 per cent of the respondents practised share-cropping; about 24.3 per cent practised it sometimes, and about 30.8 per cent practised it always (Table 4.18).

Table 4.18 Percentage households reporting share-cropping in the sampled areas

Area	Share-cropping households		
	Sometimes	Always	Total
Boinyatso	30.4	30.4	60.8
Mafefoane	14.3	28.6	42.9
Molengoane	31.3	37.5	68.8
Musuoe Theko	9.1	45.5	54.6
Ralejoe	60.0	--	60.0
Ratau	18.8	6.2	25.0
Thaba Bosiu	40.0	50.0	90.0
Thaba Khupa	--	60.0	60.0
Total	24.3	30.8	55.1

Source: Questionnaire survey conducted by the author in 1976

It was difficult to compare the figures in Table 4.18 with those in Table 4.17, because the criteria used in collecting them were different. But the figures in Table 4.18 indicate that share-cropping was widely practised in the study area.

Although share-cropping contributed to absenteeism among landholders by ensuring that their fields were cultivated in their absence and thereby securing (a) their right to the continued use of the land and (b) a share of the crop, it could not be said that it contributed to the low and fluctuating yield in crops. Allegations that share-cropping in Lesotho led to soil mining are yet to be proven, for there has been no observable

difference in the methods of production between owner-cultivated fields and fields cultivated by share-cropping partners, and the results obtained from the study area showed no difference in yield between the two field categories either. Instead, it was observed that some of the landholders stood only to gain from share-cropping with "progressive farmers" who applied inputs that were beyond the ability of the landholders themselves. It could therefore be concluded that share-cropping as such could not be related to the low and fluctuating production in crops.

Section 4.2.12 will now treat the security of tenure with a view of determining any relationship between it and crop production.

4.2.12 The relationship between security of tenure and the low and fluctuating production in crops

The various authors on the subject of land tenure in Lesotho have expressed varied opinions about the security of tenure. All the colonial reports, including Sheddick's (1954) work and the Basutoland Constitutional Commission of 1963, have expressed concern at the lack of security of tenure in Lesotho. Even in development plans for the territory the colonial administrators blamed insecurity of tenure as one of the major obstacles to agricultural productivity (Lesotho Govt. 1970 (a)). Yet in the first development plan drawn independently by the newly independent Lesotho government it was stated that "although land-use rights are less than full ownership or freehold, a piece of land can be retained by one family for generations, and rights are normally not transferred during a landholder's lifetime as long as the land is cultivated. Anyone who thinks himself wrongfully dispossessed can have recourse to the courts" (Lesotho Govt. 1976, vol 1, p.3). The concern about lack of security of tenure expressed in the colonial reports stemmed partly from past experiences with cases brought before the colonial courts involving violations of tenure rights, and partly from the fact that the customary law concept of tenure as practised in Lesotho was alien to English law.

Basotho, however, viewed land tenure in a different light and as far as they were concerned the system did not cause insecurity as long as one adhered to the conditions of tenure. There may, of course, have been some chiefs who engaged in corruption (the system of tenure could not be blamed for this as corruption was an independent phenomenon that could be found

anywhere) and if there was any concern expressed by Basotho over the land tenure system, it was concern about corruption. Hence, some of the changes introduced in the allocation of land (section 2.12.3) were meant to eliminate corruption.

Bentsi-Enchill's (1965) view on the security of land tenure in Africa may well be applied to Lesotho, namely, that "It is of the first importance to realize that security of tenure is not intrinsically a problem in most systems of land tenure in Sub-Saharan Africa. The 'tenant' in general is a peasant proprietor, entitled to farm the same land for his whole lifetime". Bentsi-Enchill, however, went on to state that Lesotho was one of the few examples of situations where there was some measure of insecurity of land tenure. His statement was based on the often quoted rule 7 (2) of the Laws of Lerotholi (1959), which stated that "every chief and every headman .....is empowered to take away land from people who in his opinion have more lands than are necessary for their and their families' subsistence.....".

Sheddick(1954, p.155) quoted the same law as it appeared in the 1946 edition of the Laws of Lerotholi to justify his statement that there was no security of tenure in Lesotho. He was later quoted and supported by Henry (1964) and Williams (1972). But if rule 7 (2) of the Laws of Lerotholi were closely scrutinised, it would be found that the rule <u>per se</u> could hardly be applied; for how could a chief allocate more than enough land to a villager and then later take it back on the same grounds? If such a "mistake" was possible, how many such cases would there be found in Lesotho?. This rule has also been superseded by subsequent

laws as shown in section 2.12.3, and it was no longer justified to quote it in establishing the existence of insecurity in the land tenure system.

Stevens (1970, p.135) in his study of the Mokhokhong valley (for its location, under the name Phillipi, see Fig.1.3) found that "no well-tended, productive field of a villager has ever been surrendered and given to another". Hamnett (1975, p.74) also found that while negative reasons could be provided for withholding an allocation, land could be lawfully taken away only on positive and specific grounds. The views of these two recent writers contradicted the earlier views expressed by Sheddick.

Douglas and Tennant (1952, p.92) provided a table showing the mean period during which land had been continuously occupied by the same households. On utilizing these figures to test security of tenure Williams, who held the view that there was insecurity of land tenure in Lesotho, concluded that "there is, in fact, a measure of security ....." (Williams 1972, p.10).

The periods when villagers felt insecure about their lands were those when some projects were introduced in their areas, for then there was good reason for the chief or government to take away their lands. This panic situation was well expressed by Wallman (1969, pp.106-107), but it would be found that, as Wallman explained, the villagers were ultimately re-allocated land. The source of panic in the case of Bataung seemed to have stemmed mainly from the fact that the villagers were not well informed about what was going to happen when conservation work was introduced into their area. It was found that in the

Thaba Bosiu Rural Development Project area the villagers no longer expressed anxiety about the security of their lands, mainly because of the different approach that the projects had adopted, namely, that of educating and involving the villagers in the work of the projects.

It could then be concluded that there was no cause for feelings of insecurity of land tenure in Lesotho as far as crop production was concerned, and that insecurity of tenure as such could not be related to the low and fluctuating production in crops. The methods of producing crops in the study area will now be examined.

4.2.13 The relationship between methods of production and the low and fluctuating production in crops

During the questionnaire survey it was discovered that only one respondent practised irrigation in her fields. She came from the area of Mafefoane and produced only vegetables, which were sold to the institutions at Roma, in the irrigated fields. The rest of the farmers practised dry land farming and irrigation, if any, was confined to the gardens and isolated project areas elsewhere in Lesotho. This lack of irrigation in an area that had such an erratic rainfall was one of the prime causes of the low and fluctuating production in crops.

It was evident from the air photographs that contouring and the grass strip methods of cultivation were observed almost without exception where the slopes were significantly inclined. This showed that Basotho farmers observed the standard conservation measures that were enforced by law (Basutoland Govt. 1959). During the questionnaire survey they further demonstrated an awareness of the different methods of soil conservation. There were, however, farmers who felt that the grass strips diminished the size of their fields, and it was observed that they had a tendency of reducing their widths during ploughing - a practice that led to the weakening of the effectiveness of the grass strips in preventing erosion. Sheet erosion in such areas played a major role in depleting soil fertility with the resultant low crop yields.

There were, according to the questionnaire survey, only about 33 per cent of the total households that never used any fertilizer on their fields and nine per cent that used dung.

The rest used fertilizer bought mainly from the government-run agricultural co-operative scheme. The 1974 prelisting results, however, showed that the average fertilizer input in the study area was only about 175 kg per user, whereas the recommended input was about 300 kg per ha. This showed that although there were signs that many farmers had responded to the call for the use of fertilizer, many did not apply adequate quantities, seemingly because they could not afford the cost. Consequently, yields did not show a marked increase inspite of the apparent increase in the use of fertilizer.

The results of the survey showed that less than ten per cent of the farmers used graded seed bought from the agricultural co-operative scheme for maize and sorghum, yet about 30 per cent of the farmers who raised beans used graded seed. This was a good indicator that the farmers' swing towards the raising of cash crops was accompanied by an increasing awareness of the input requirements in raising cash crops.

It was also found that only about ten per cent of the households had used a tractor for more than five years for ploughing. Another 30 per cent had just started using it, apparently as a result of the farm mechanization scheme of the Thaba Bosiu Rural Development Project. The rest had never used a tractor. Very few farmers, of course, owned tractors and many of those that did use them had to hire them. Since the nature of crops raised in Lesotho and the soils on which they were raised would be more efficiently cultivated by tractors, it was evident that the farmers did not apply sufficient inputs in raising the crops.

Table 4.19 shows that there was marked division of labour in crop production activities. About 95 per cent of the participants in ploughing the fields were male members of the households and only five per cent were female. In fact, in five of the eight sampled areas ploughing was carried out entirely by the male members.

Table 4.19 Division of labour in crop production expressed as percentage of total participants*

Area	Ploughing				Harvesting			
	Male		Female		Male		Female	
	Adult	child	Adult	Child	Adult	Child	Adult	Child
Boinyatso	62	29	9	-	33	14	47	6
Mafefoane	46	46	4	4	22	16	33	29
Molengoane	54	46	-	-	26	-	67	7
Musuoe Theko	54	31	15	-	26	-	53	21
Ralejoe	100	-	-	-	30	-	50	20
Ratau	44	56	-	-	8	-	62	30
Thaba Bosiu	73	27	-	-	50	6	38	6
Thaba Khupa	71	29	-	-	-	25	75	-
Total	57	38	4	1	24	9	49	18

* exclude outside assistants and hired labour

child = every member of household below 18 years of age

Source: Questionnaire survey conducted by the author in 1976

It was the weeding operations that were carried out almost entirely by the womenfolk. Women also did most of the harvesting as illustrated in Table 4.19. Table 4.19 invalidates the allegation made by some writers that as a result of migrant labour the ploughing was done by the women and children and that this led to shallow ploughing which was alleged to be one of the causes of low yields.

The five per cent householders that participated in ploughing were in actual fact merely there to supervise their fields while male relatives, neighbours or friends (most of whom were share-cropping partners),or hired males were doing the ploughing. The amount of such help is shown in Table 4.20.

Table 4.20 Percentage householders that used outside help in crop production by activity and by status of assistants

Areas	Ploughing			Harvesting		
	Unpaid	Hired	Project	Unpaid	Hired	Project
Boinyatso	48	35	-	65	17	-
Mafefoane	33	57	-	62	29	-
Molengoane	25	50	-	19	13	-
Musuoe Theko	73	18	-	45	-	-
Ralejoe	60	20	-	-	-	-
Ratau	13	44	25	-	-	-
Thaba Bosiu	60	30	-	30	10	-
Thaba Khupa	60	30	-	30	-	-

Source: Questionnaire survey conducted by the author in 1976

Table 4.20 shows that a total of about 84 per cent of the households depended on outside help during ploughing and 51 per cent depended on it during harvesting. Whereas during ploughing the amount of assistance received from friends and share-croppers was about the same as the amount of hired labour, most of the assistance during harvest came from friends and share-cropping partners. The nature of the division of labour and the amount of unpaid assistance that was found among the villagers demonstrated the degree of inter-dependence among them which was characteristic of communalism. The communal way of life of rural Basotho ensured that the normal task of production was continued in the absence of the landholders, and thus prevented production

from fluctuating with the incidence of absenteeism. The marketing of crops will be examined in section 4.2.14.

4.2.14 The relationship between the marketing of crops and the low and fluctuating production in crops

Considering the small size of Lesotho's population and the low *per capita* income, the local market was limited. Surplus agricultural produce had thus far been exported to neighbouring South Africa. Although there were some politico-economic constraints in the relations between the two countries, there was not much choice of markets for the enclave Lesotho with a small amount of produce.

In South Africa's market Lesotho's produce competed with South Africa's produce that was produced cheaply. This meant that Lesotho's marketing system had to be efficiently organised in order that her produce stood the competition. Lesotho's Produce Marketing Corporation was, however, not well equipped with handling, grading, packing and storing facilities and could therefore only market dry crops and processed products. Even the collection of produce from the farmers was limited, and many farmers sold their produce to local traders or to neighbours because it was uneconomic to transport them to distant markets. Only beans were sold to the marketing corporation because there was organised collection of this produce from the villages. The lack of organised marketing for the other produce was most obvious in the case of fruit and vegetables. Many farmers produced these in abundance in their gardens but had to give them away to friends. This lack of adequate marketing of agricultural produce was in many ways discouraging to the farmers, and was partly responsible for lack of enthusiasm and consequent low yields in farming. The few cases in Lesotho where there was organised

marketing, such as the wheat and potato marketing schemes in the Leribe district, demonstrated that farmer productivity could be stimulated by assured sales for his produce.

4.3 Summary

Agriculture was the mainstay of the economy of the study area. The production of crops has, however, been mainly at subsistence level and it was characterized by considerable fluctuations from year to year. For a balanced assessment of the production situation, it was found necessary to consider the socio-economic factors vis-à-vis the physical environment in which crops were produced.

It was established that the factors that were obviously related to the fluctuation in crop production were the adverse weather conditions, especially the erratic nature of the rainfall, with which the farmers were unable to cope due to their financial and technological limitations. The combination of these factors was also found to be responsible for the low production in crops.

Apart from its direct influence on crop production by its erratic nature, the rainfall in Lesotho comes in thunder showers that are highly erosive on the erodible soils of a bare and rugged landscape. Soil erosion as well as monocropping caused soil fertility depletion which in turn resulted in low yields. Low crop production also resulted from the lack of enthusiasm in raising winter crops caused by communal grazing, and wasted time and energy that resulted from movement between the fragmented land holdings.

It was demonstrated that there was a general tendency for the farmers to respond to the efforts of the government in encouraging the production of cash crops. Progress in this

direction was, however, found to be very slow due to the limitations imposed by the inadequate physical and socio-economic resources.

Although this was less significant in the study area, it was established that areas near roads, schools and other service centres tended to attract settlements. Hence in the lowland areas there was a general displacement of cultivated land by settlements - a phenomenon that was found to be diminishing the size of cultivated land with the result that householders opened up virgin land for cultivation. The opening up of virgin land for cultivation in the foothill zone resulted from the allocation of land to newly settled villagers. Much of the virgin land opened up for cultivation was unsuitable for cultivation and its continued use for cultivation under poor management only led to accelerated erosion, depletion of soil fertility, and the consequent low yield.

The increase in settlements as well as the opening up of virgin land for cultivation were symptoms of an increasing population. An examination of this population trend and its implications on the supply of food from agriculture is made in the next chapter.

CHAPTER 5.

CHANGES IN THE MAN/LAND RATIOS.

5.1 Population growth

In 1891 the recorded population of Lesotho was about 281,504. This figure increased by about 84.4 per cent to 402,919 in 1911. Using the formula (used in the U.N. demographic year books)

$$\left(\sqrt[t]{\frac{P_2}{P_1}} - 1 \right) \times 100$$

where P_1 = population at the beginning of the period

P_2 = population at the end of the period

t = number of years

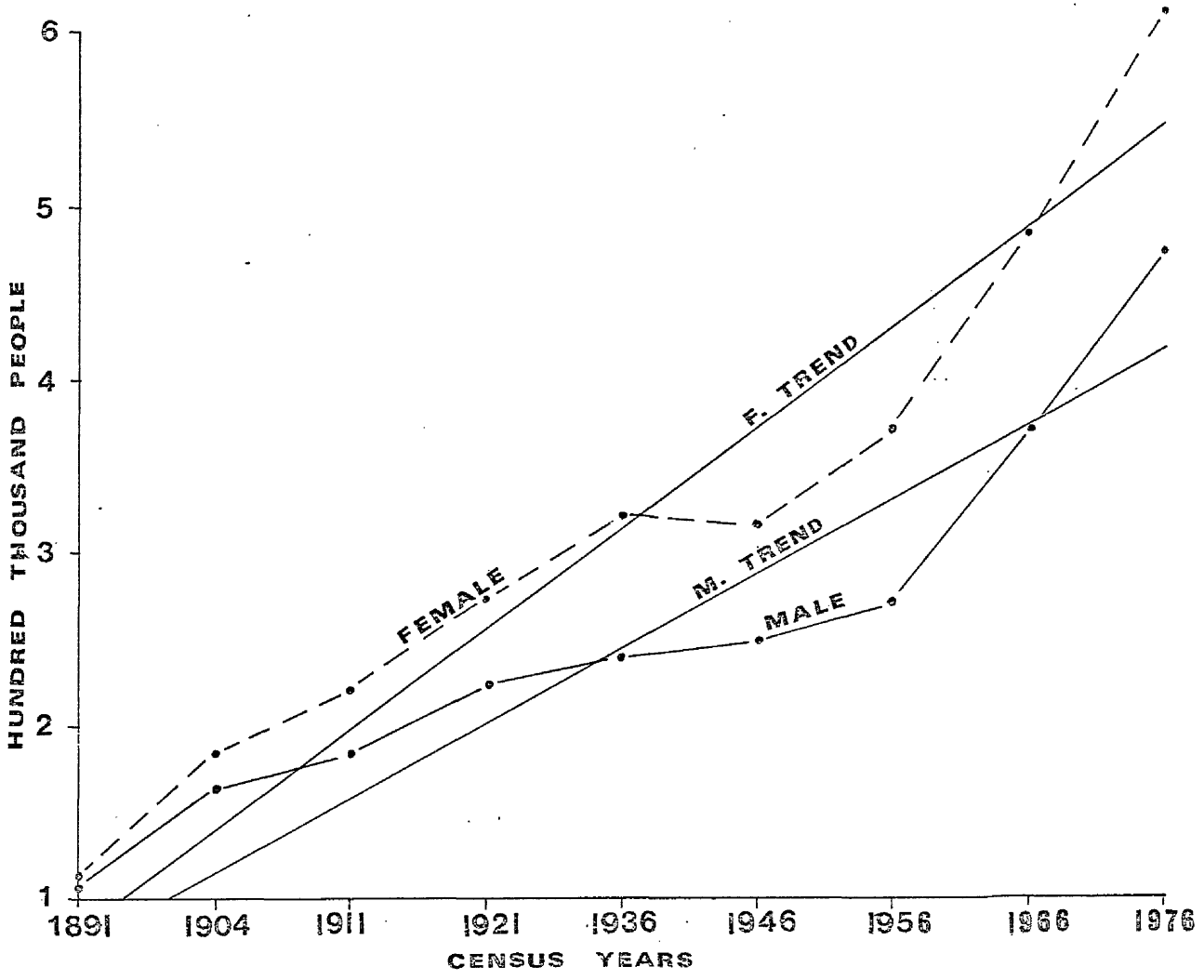
the estimated annual growth rate of the population was about three per cent compound. At this rate it took about 23 years for the population to double. From 1911 it took about 50 years for the population to double; the intercensal growth rates during this period being about 2.4 per cent between 1911 and 1921, 1.3 per cent between 1921 and 1936, 0.4 per cent between 1936 and 1946, and 1.4 per cent between 1946 and 1956. This sudden decrease in the rate of growth can be explained by referring to past relationships between Lesotho and neighbouring South Africa. Before and during the early colonial days the territory of Lesotho was conceived as part of the Republic of South Africa by both the South African and British regimes, and when the Act of Union of South Africa was passed in 1910 it contained provisions for the future incorporation of not only Lesotho but all three High Commission Territories, Lesotho, Botswana and Swaziland. Indeed, it took some resistance in the form of protests and petitions, by the nationals of these

territories to retain their autonomy, The South African and British idea was to integrate these three territories into the labour market of South Africa, which was one of the reasons why the colonial administration neglected the development of Lesotho. There was thus a free flow of people between Lesotho and South Africa that resulted in a net loss of population in Lesotho.

Not only did people leave Lesotho for work in the different industries of South Africa, but some were permanently absorbed into the population of South Africa. Leistner estimated the number of Basotho that were permanently absorbed into the South African population at 100,000 between 1936 and 1946 and 40,000 between 1946 and 1956 (Leistner 1966, p. 4). One remarkable feature of the population of Lesotho during the period 1936 to 1946 is the fact that the de facto female population, as illustrated in Fig.5.1 decreased by about 1.9 per cent whereas the number of female absentees increased by an unusually high figure of about 42.6 per cent. It should be noted that this high increase in the number of female absentees coincided with the exceptionally low growth rate of 0.4 per cent. While it is reasonable to conclude that this low growth rate was due to emigration, and especially the apparent emigration of families, it should be borne in mind that the period 1936 to 1946 was the World War II period (1938 - 1945) during which population growth rates of many other parts of the world were adversely affected.

When the Nationalist party took over power in South Africa in 1948 it embarked on a policy of "apartheid" (later modified

De facto population of Lesotho, 1891-1976 Fig. 5.1



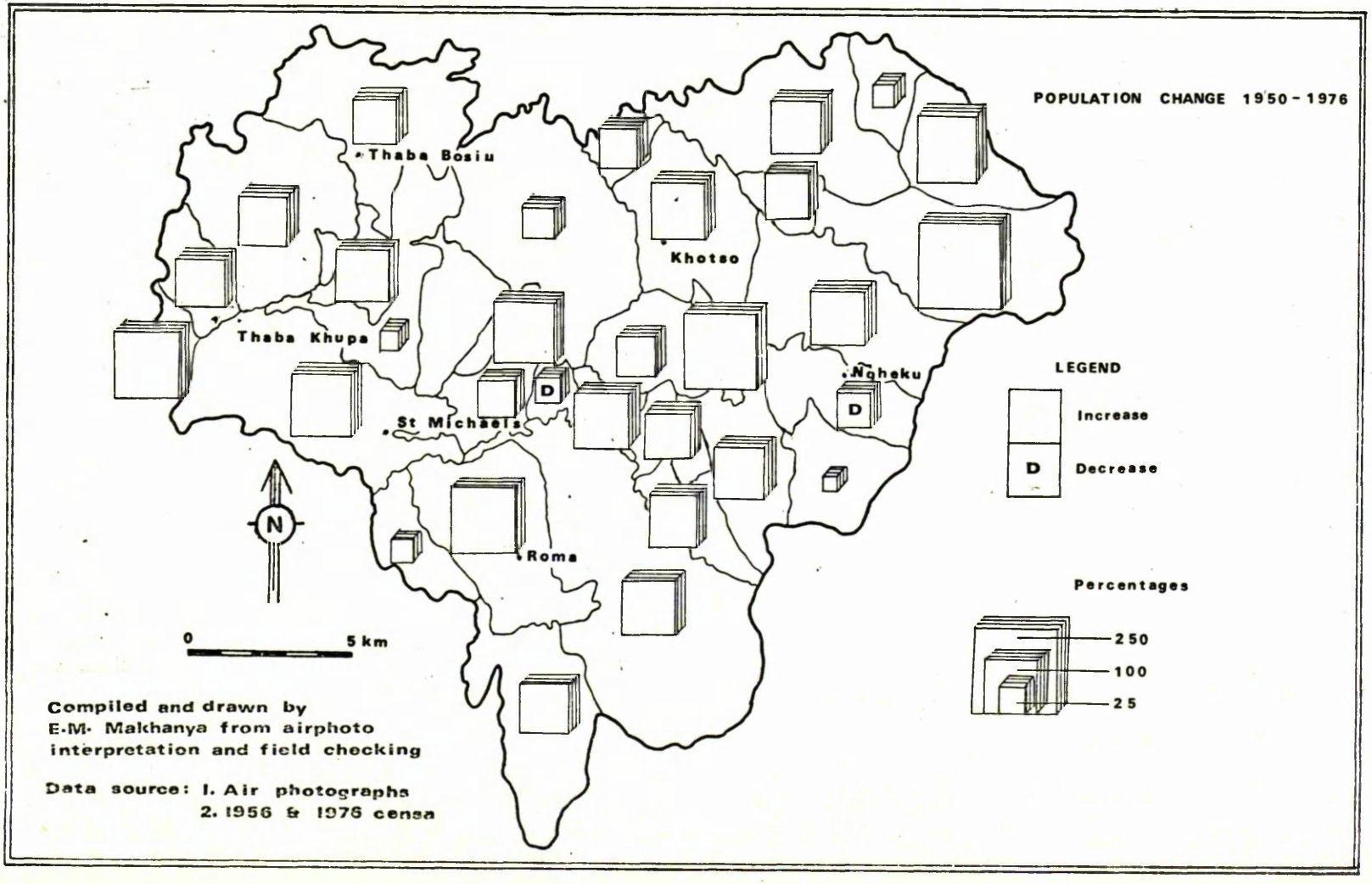
Data source: Lesotho-Annual Stat. Bulletin 1965
1976 census

to separate development). By this policy, which was intended inter alia to give ostensible self-government to the so called "Bantu homelands", the idea of incorporating the High Commission Territories was abandoned and instead a series of laws was passed that restricted the movement of Africans in the Republic of South Africa. Mainly as a result of these laws there was, between 1956 and 1966, a remarkable decrease in the number of Lesotho's absentees. The number of Basotho emigrating to South Africa was further restricted since 1963 by the introduction of border control posts between the Republic of South Africa and the High Commission Territories. The result was an increase in the rate of growth of Lesotho's population, which is officially given as 2.2 per cent compound.

Between 1950 and 1976 the total population of the study area increased by about 86.9 per cent, yet the population of Lesotho during the same period is estimated to have increased by about 73 per cent. The higher increase in the case of the study area implied that there was net immigration into it, resulting from internal migrations, over and above the natural increase.The effect of internal migrations on population growth rates is evident also within the study area. In Fig. 5.2 it can be seen that while the rate of population increase was very high in some areas there was a decrease in population in others. The spatial variation in the rate of population increase is very closely associated with that of the estimated amount of internal migration, the correlatiom coefficient (r) between the two variables being about 0.999 (cf. Figs. 5.2, 5.3, and 5.4). The factors governing internal migrations in Lesotho were discussed under sections 4.2.3.2 and 4.2.3.3.

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.2



Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.3

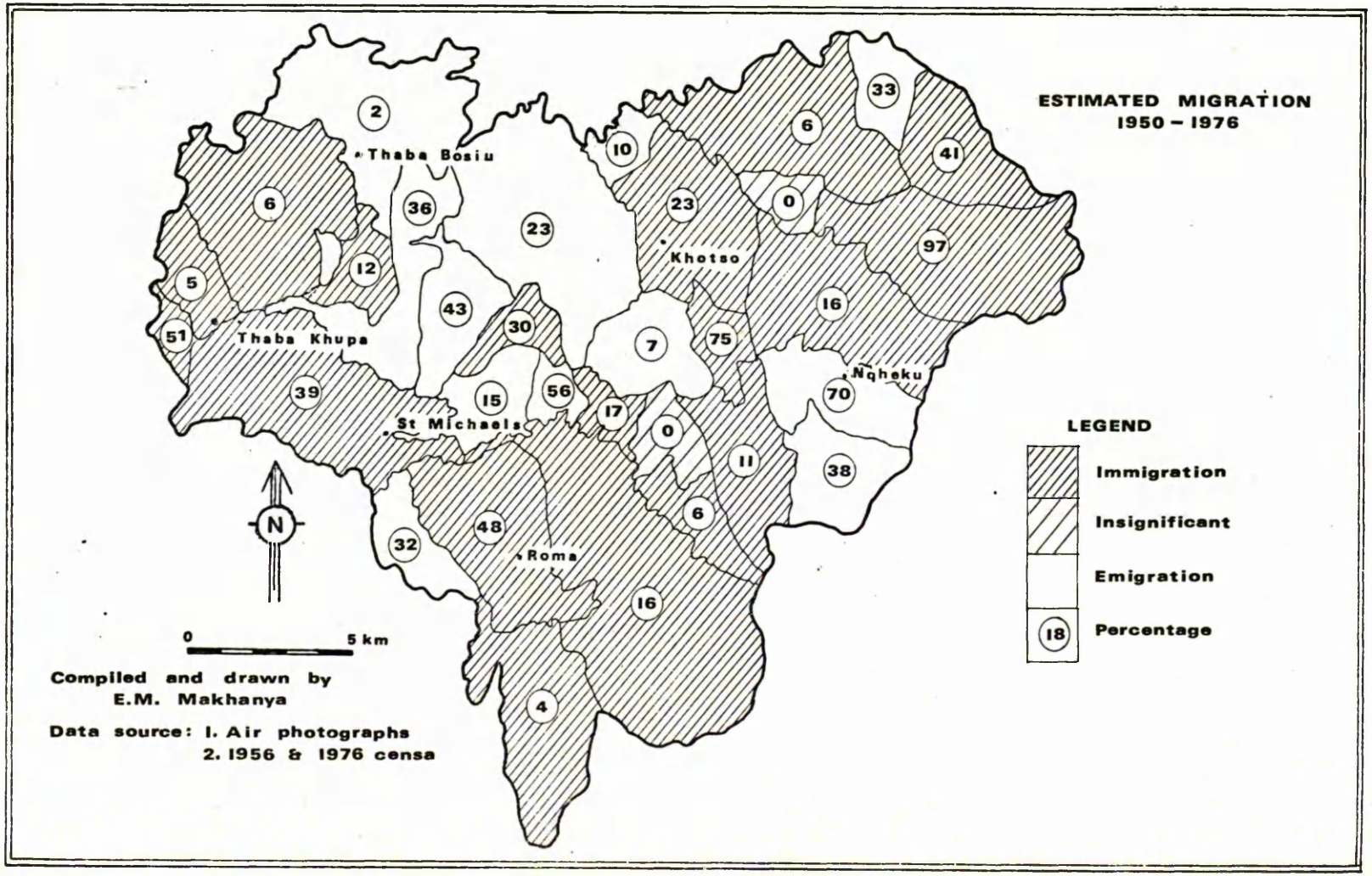
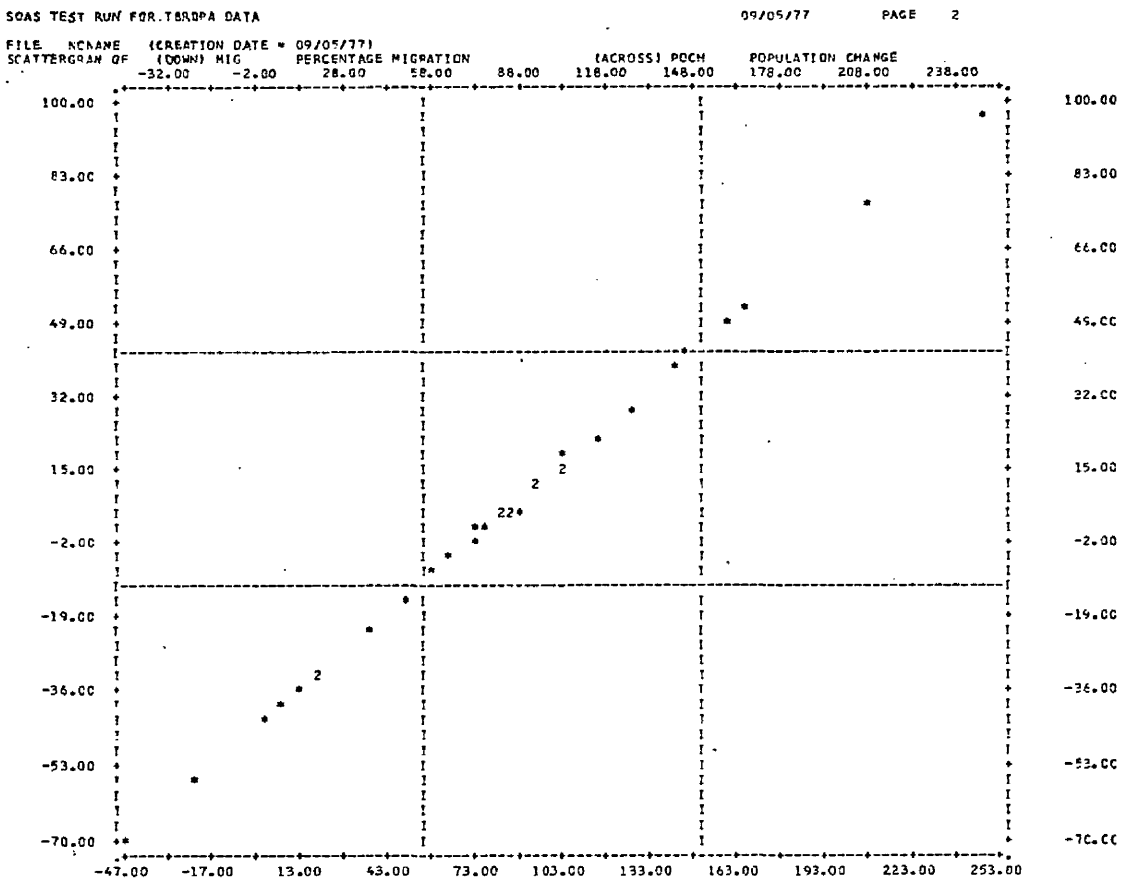


Fig. 5.4

Correlation between estimated migration and population change



STATISTICS..

CORRELATION (R)-	0.99991	R SQUARED -	0.99983	SIGNIFICANCE -	0.00001
STD ERR OF EST -	0.48692	INTERCEPT (A) -	-42.82286	SLOPE (B) -	0.56961
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

Further discussion on the spatial distribution of population in the study area follows in section 5.2.

5.2 Changes in the pattern of population distribution

As explained under section 2.13.1 the rural population normally lived in traditional villages that were in clusters ranging in size from three to about 160 households. The villages themselves were sparsely though generally evenly distributed throughout the study area. Hence there was an even distribution of population clusters as illustrated in Fig.5.5.

In section 4.2.3 it was explained how settlements and cultivated land were mutually exclusive. This relationship between settlements and cultivated land partly explains the presence of patches of what appears to be unoccupied areas shown in Fig.5.5. This pattern of population distribution may also be explained by the fact that Basotho retained the traditional sites for their villages, on the plateau tops and hill slopes, and in many places the pattern of distribution of the population corresponded to the alignment of relief features. This was especially true of the scarp marking the boundary between the foothill and lowland zones throughout which there were villages either perched on top of the plateau or sited along the foot of the scarp. Another factor that strengthened the attachment of villages to the sites they occupied was the fact that the rural population largely depended on springs for the supply of domestic water, and these springs were usually situated near the hill slopes.

Even-ness in the distribution of population in the study area is further evidenced by the fact that the size of the

population was more or less proportional to the size of the land allocation areas, the correlation coefficient between the two variables being about 0.83 (Fig.5.6).

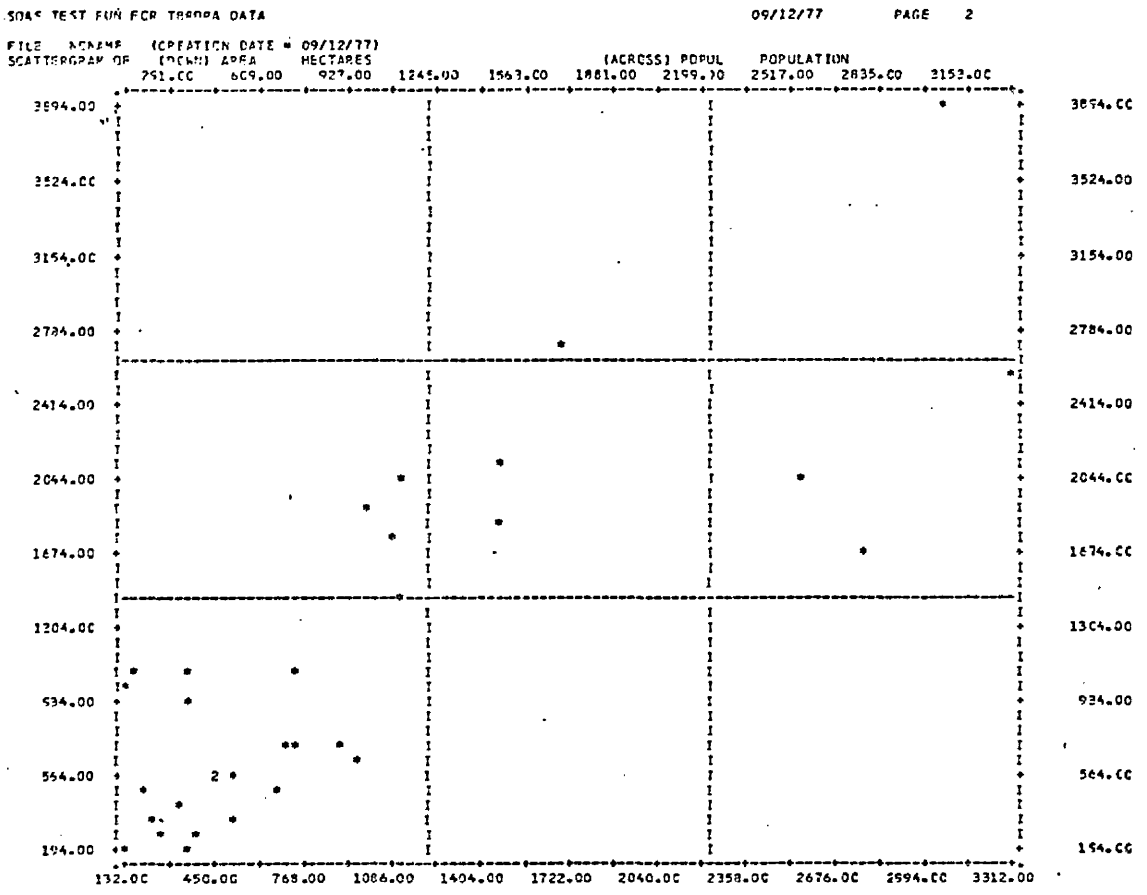
There was, however, marked zonal differentiation in the distribution of the population. In 1976 the population of the areas situated in the lowland zone was about 40 per cent of the total population of the study area, yet the size of the lowland zone in the study area was only 27 per cent of the total area. This confirms the fact alluded to in section 2.14.2 that there was a relatively high concentration of people in the lowland areas. Apart from the fact that people were attracted to the lowland areas by the relative availability of arable land, the reason why there was a higher concentration of people in this zone was ease of accessibility to social services such as schools, hospitals and transport, as well as proximity to places of paid employment.

The results of the questionnaire survey show that about 60 per cent of the respondents who were new settlers in the area of Mafefoane had come to settle there because of proximity to places of employment and social services. Many residents of the densely populated area of Mafefoane were without land for cultivation and lived mainly on paid employment. A survey on employment opportunities conducted in the area of Mafefoane revealed that there were, however, only 670 unskilled and 430 skilled jobs available in the area (Table 5.3).

There was also a relatively high concentration of people along the tarred road between Roma and Maseru along which there

Fig. 5.6

Correlation between population size and size of land allocation areas



STATISTICS..

CORRELATION (R)-	0.82929	R SQUARED -	0.68772	SIGNIFICANCE -	0.00001
STD ERR OF EST -	2.79064	INTERCEPT (A) -	352.19074	SLOPE (B) -	0.84238
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

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were fairly regular bus and taxi services. The distance between Roma and Maseru is only about 35 km, and those who could afford the fares could travel daily along this route to Maseru where there were more social services and job opportunities. Two branches of the Roma-Maseru road that provided relative ease of accessibility to this main road in the study area were the Thaba Bosiu-Makhalanyane and the Mountain roads (Fig.1.2). On fair weather conditions these roads also provided fairly regular transport to and from Maseru. People along the Thaba Bosiu-Makhalanyane road had the added advantage of being nearer to Maseru, hence the relatively high concentration of population along it.

The decision of people to settle anywhere in the study area could, however, be effective only on the consent of the chiefs and their advisers. On the other hand the chiefs' decision to accept or reject new settlers depended on the availability of land. Thus population increased at a higher rate where the chiefs were willing to accept new settlers, and at a slower rate where there were few or no new settlers accepted.

In spite of the general tendency of people to settle near areas which provided easy access to social services and employment opportunities there was, between 1950 and 1976, no significant change in the spatial pattern of population distribution in the study area. This is confirmed by the fact that the correlation coefficient between the 1950 and 1976 population distribution was about 0.93.

5.3 Changes in population densities

In 1976 the mean population density in the study area was about 82 per km^2 with a standard deviation of 44. In the same year the territorial mean was only about 40 per km^2, being about 70 in the lowland and foothill zones together and about 14 in the mountain zone. This shows that there were comparatively more people settled in the study area than average.

Apart from the zonal differentiation in population densities there is no significant covariation between the 1976 population densities and the differences in size of the land allocation areas, as illustrated in Fig.5.7. This further emphasises the even nature of population distribution in the study area.

Table 5.1 shows the frequencies of areas according to density classes. Of the 13 areas with densities between ten and 70 people per km^2 about nine were accessible only with difficulty.

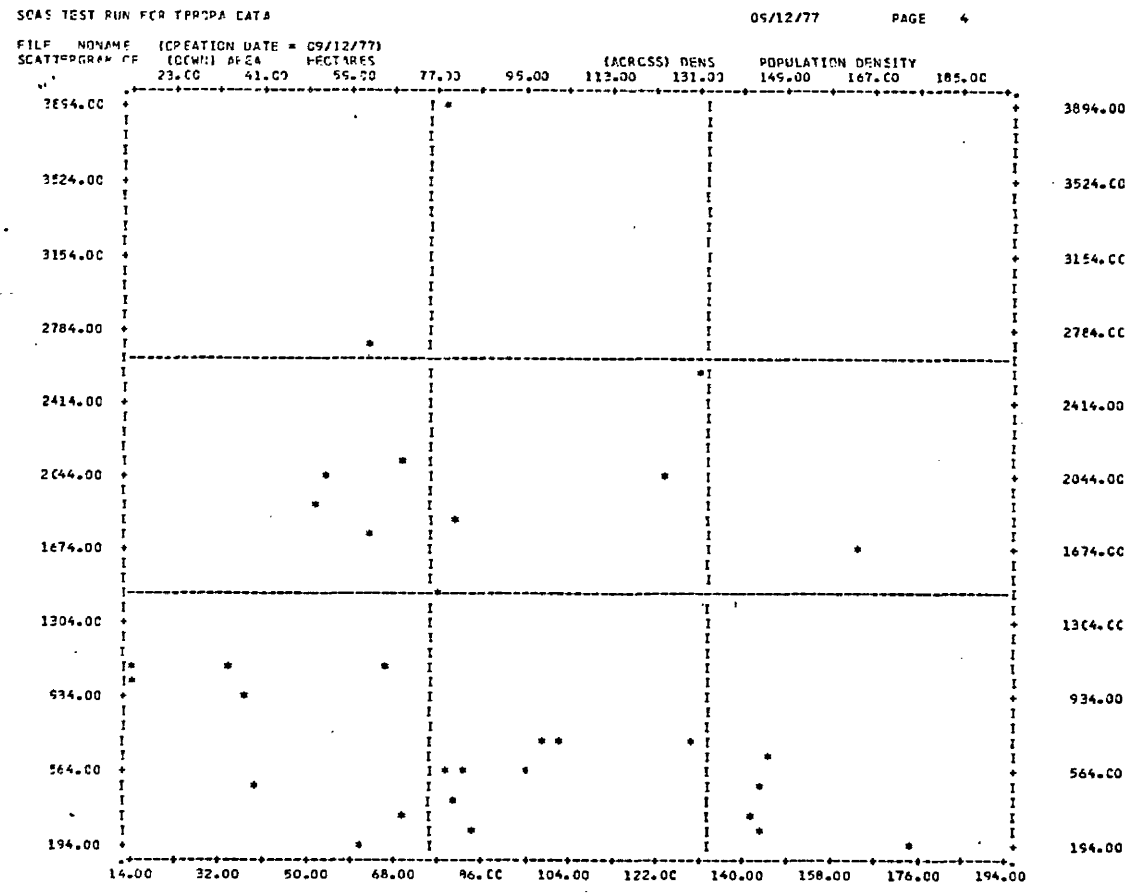
Table 5.1 Population densities in the study area, by land allocation areas.

Density class people/km^2	No.of areas	Relative frequency %	Cumulative frequency %
10 - 40	5	16	16
41 - 70	8	25	41
71 - 100	9	28	69
101 - 130	3	9	78
131 - 160	5	16	94
161 - 190	2	6	100
Total	32	100	

Data source: 1. Airphoto interpretation
2. 1976 census

Correlation between population density and size of land allocation areas

Fig. 5.7



STATISTICS..

CORRELATION (R)-	-0.15448	R SQUARED -	0.02386	SIGNIFICANCE -	0.19928
STD ERR OF EST -	8.92925	INTERCEPT (A) -	1426.44980	SLOPE (B) -	-3.22379
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

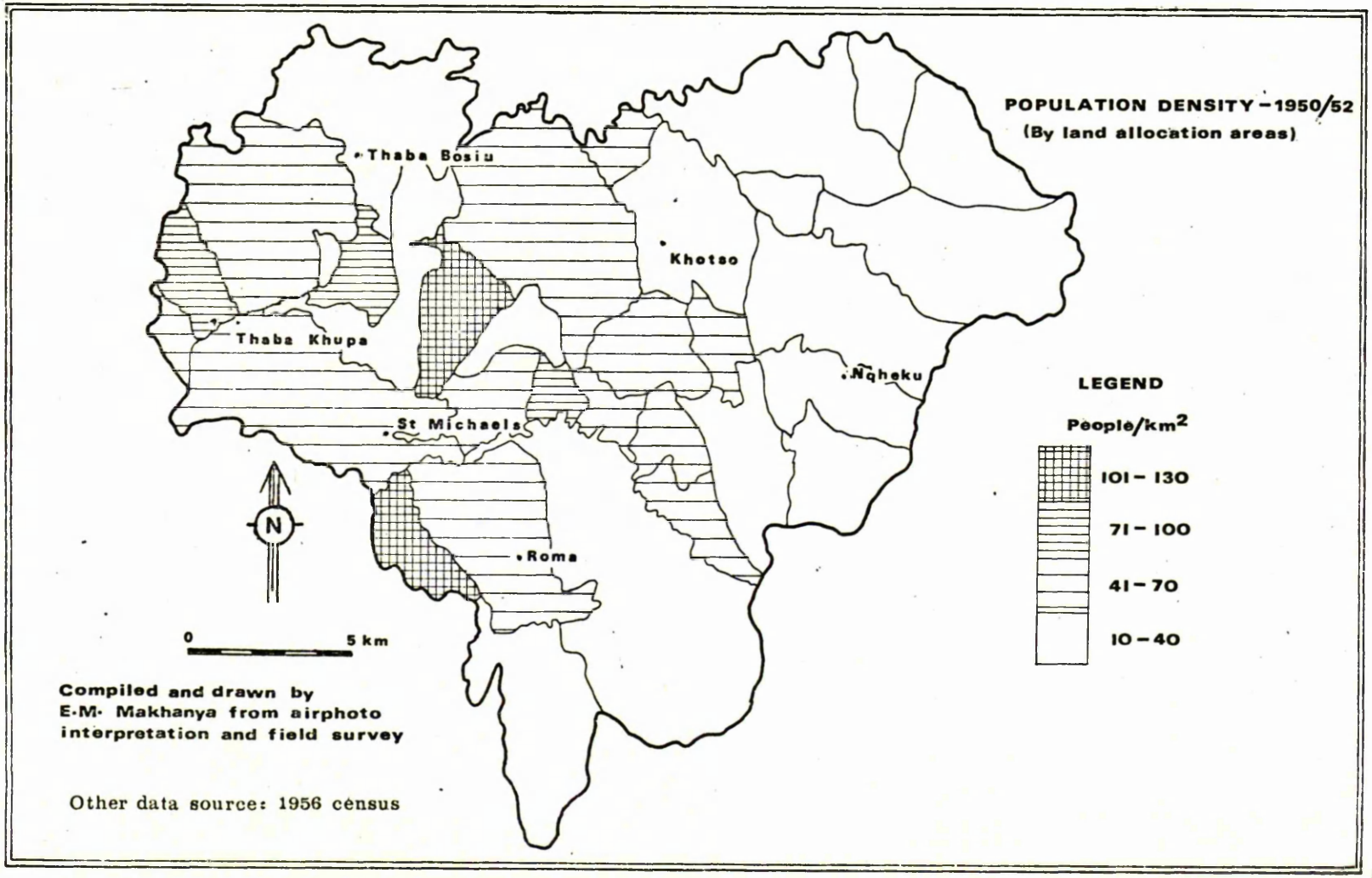
********** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

These included the areas of Makotoko Makotoko, Masupha Makotoko, Makhabane Makotoko, and Rabotsoa, which were wedged between the gorges of the Phuthiatsana (Little Caledon) River in the north and Phiring River in the south, and the high Machache Mountains in the east. The areas were isolated in that the only type of wheeled transport that could reach them were four-wheel-drive vehicles, and only in fair weather conditions. Otherwise only horses and donkeys were used for transport. It stands to reason that people normally tended to shun living in them. There were also difficulties of accessibility to large parts of the areas of Mothobi, Nqheku, Ramotsoana, Ramakha and Tumahole which were also characterized by comparatively low population densities. Although lack of accessibility was associated with low densities, it does not by any means provide the complete answer to the existence of low density areas. For there were many examples of areas with difficulties of accessibility but that were nevertheless densely populated, e.g. Ntsane, Ponoane, and areas around Lebamang. There were other factors such as the availability of arable land that also influenced the pattern of population distribution; these factors had to be considered as well in order to get a full explanation to the pattern of population distribution in the study area.

The 1976 density figure of 82 people per km^2 was 86 per cent higher than the 1950 figure of 44 people per km^2. The correlation coefficient between the 1950 and the 1976 population distribution by densities was, however, only about 0.58. This was much lower than the high positive correlation coefficient of 0.93 obtained in the comparison of the numerical distribution of population for the same period. This is

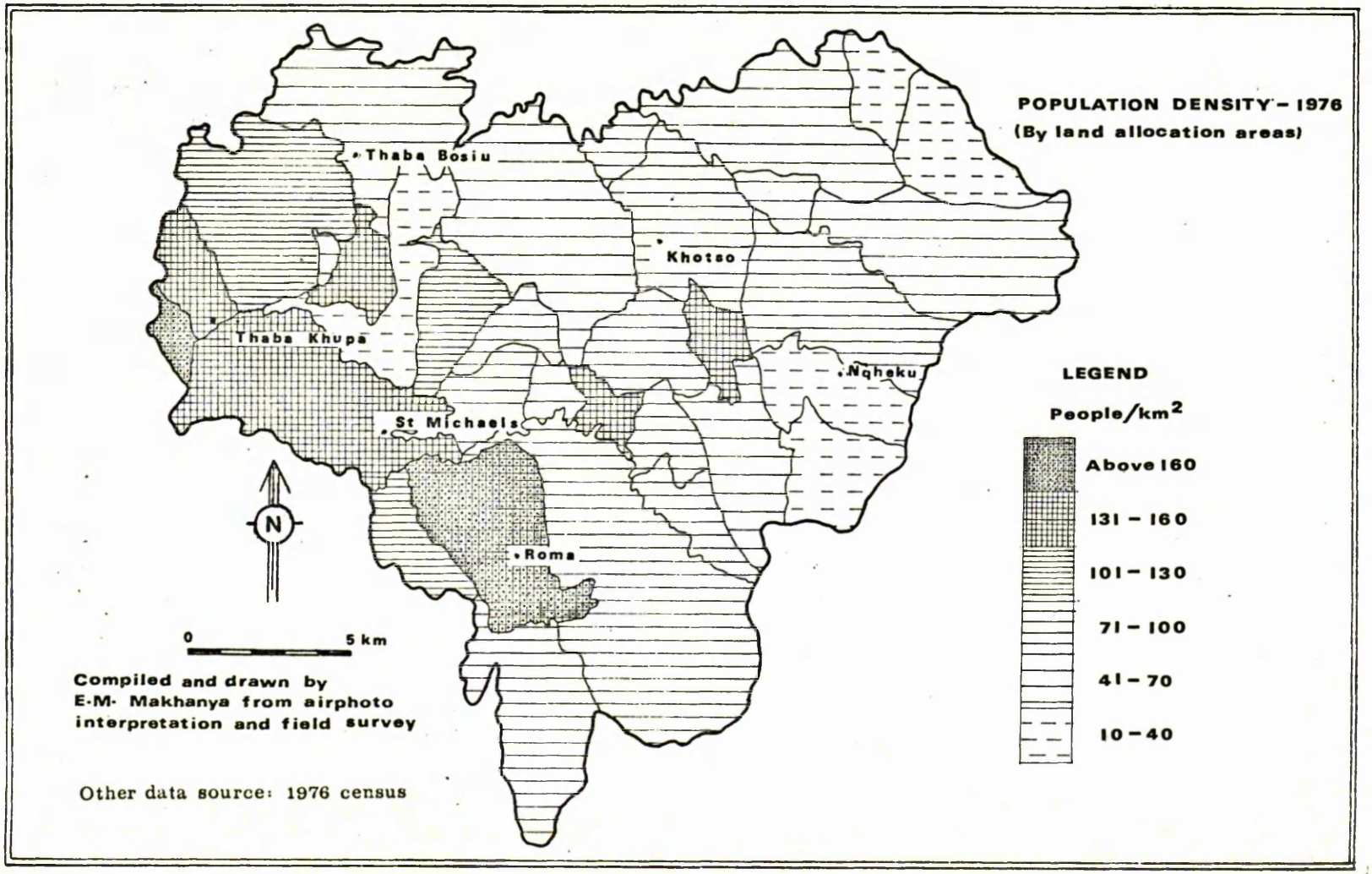
Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.8(a)



Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.8



because although the changes in densities covaried with the changes in population numbers, the changes in the two variables did not have the same effect on the ranks of the different land allocation areas. The existence of areas with (a) exceedingly high increases in densities, e.g. Molengoane, Mafefoane, and Makhalanyane with increases of 96, 101 and 109 people per km^2 respectively and (b) decreases in densities e.g. Nqheku, Phaloane and Mohalenyane with -12, -18 and 0 people per km^2 respectively, caused big swings in the ranks of the different areas. Hence the lower figure of the coefficient of correlation.

Having considered the nature of the changes in densities against the positive correlation coefficient of 0.58 at the 0.0003 level of significance between the spatial distribution of the 1950 and 1976 densities, it could be concluded that there has generally not been any significant change in the spatial pattern of population distribution within the study area. The mean population density has, however, increased by about 86 per cent between 1950 and 1976. During the same period the mean density for Lesotho increased by about 82 per cent from 22 people per km^2 in 1950 to 40 in 1976. The rate of increase in population density in the study area was thus higher than territorial average, once more signifying the fact that there was net immigration into the study area.

From the correlation coefficient of 0.47 between the 1976 population densities and population change it could be seen that the spatial variation in population densities in the study area was associated with the differences in the rates of

population increase. Since there was no significant correlation between the 1950 population densities and the rates of population change, it was unlikely that the rates of increase were influenced by the existing densities. It could rather be said that the spatial variation in densities resulted from the different rates of population increase which, as already pointed out, were symptomatic of internal migrations.

Apart from the desire to be in the proximity of social services and places of employment, another factor motivating people to settle in a rural area in the lowland and foothill zones of Lesotho was the availability of arable land. Section 5.4 examines the implications of the changes in population densities on the availability of arable land.

5.4 Densities on cultivated land

In 1976 the estimated de jure population density on cultivated land in Lesotho was about 313 per km^2 or 3.13 per ha (Table 2. 6), the densities in the lowland and foothill zones being about 249 and 363 per km^2 (2.49 and 3.63 per ha) respectively. During the same year the mean density on cultivated land in the study area was about 247 people per km^2 or 2.47 per ha. This meant that, compared with other areas situated in the lowland and foothill zones, the study area had lower densities on cultivated land than average. When considering the fact that the study area had comparatively higher crude population densities than the average for the territory, it is evident that the percentage of arable land available in it was higher than average.

Although the mean population density on cultivated land in the study area was about 2.47 per ha, the majority of the areas had means of between 2.1 and 3 people per ha (Table 5.2). In fact the mode was 1.8 people per ha, the relatively high mean of 2.47 per ha being caused mainly by the very high mean of 6.4 obtained in the area of Mafefoane. As it has already been stated that many people in the area of Mafefoane were wage earners and not dependent on the cultivation of crops, it could be seen that the actual mean density on cultivated land in the study area was much lower than the territorial mean for the lowland and foothill zones, and many times lower than the mean for the mountain zone.

The study area was thus one of the areas in Lesotho that

had been able to absorb more new settlers between 1950 and 1976.

Table 5.2 Population densities on cultivated land in the study area, by land allocation areas

Density class people/ha	No.of areas	Relative frequency %	Cumulative frequency %
1 - 2	8	25.0	25.0
2.1 - 3	20	62.5	87.5
3.1 - 4	3	9.4	96.9
above 4	1	3.1	100.0
Total	32	100.0	

Data source:
1. airphoto interpretation
2. 1976 census
3. 1974 prelisting

It was shown in section 4.2.3 that, because of land scarcity, the acceptance of new settlers in rural Lesotho frequently necessitated the opening up of virgin land for cultivation. In the study area the hectarage of cultivated land was increased by about 4.3 per cent between 1950 and 1976 as a result of virgin land being opened up for cultivation, mainly by new settlers. There was, on the other hand, a net decrease of about 2.2 per cent in Lesotho's total area of cultivated land between 1950 and 1970. This indicates that the study area was one of the areas that had a comparatively high percentage of arable land in Lesotho.

In spite of the fact that there was a net increase in the area of cultivated land in the study area against a net decrease in the territory as a whole, changes in population densities on cultivated land were the other way round. In the study area the mean population density increased by about 79 per cent

between 1950 and 1976 against an increase of about 56 per cent in the territory's mean between 1950 and 1970. This indicates that the population growth rate in the study area was higher than the average for the territory and, as pointed out, this was because there was net immigration into the study area resulting from internal migrations.

As a result of the general increase in population densities on cultivated land there was general decrease in the per capita farm size. As shown in section 4.2.7 the average farm size in Lesotho decreased from 2.5 ha in 1950 to 2.0 ha in 1970.

It has been noted that whereas the study area had higher crude population densities it had lower densities on cultivated land than territorial average. This anomaly does not necessarily mean that there was a negative correlation, or no correlation, between the two variables. On the contrary there was a fairly strong positive correlation between them as evidenced by the correlation coefficient of 0.63 obtained in the case of the study area (cf. Figs.5.8, 5.9 and 5.10). The existence of anomalous situations where areas with high crude densities had lower densities on cultivated land could be explained in terms of varying ratios of available arable land to total land area. Areas that had a low degree of ruggedness, and therefore high percentage of arable land, could have comparatively high crude population densities without necessarily having high densities on cultivated land, e.g. Molengoane, Ponoane, and Thaba Khupa. On the other hand, areas with a high degree of ruggedness, and therefore low percentages of arable land, could have low crude densities without necessarily having low

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.9

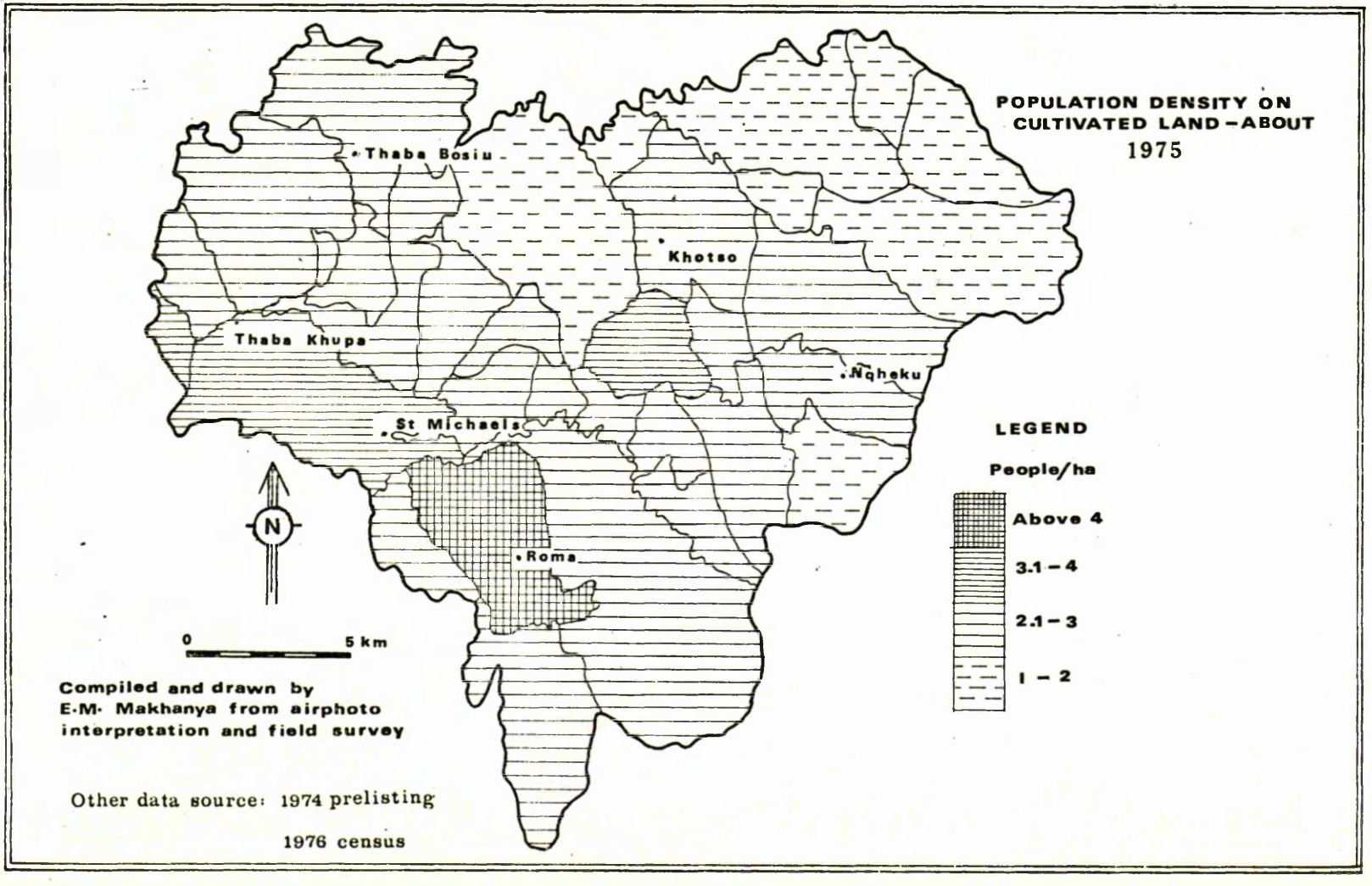
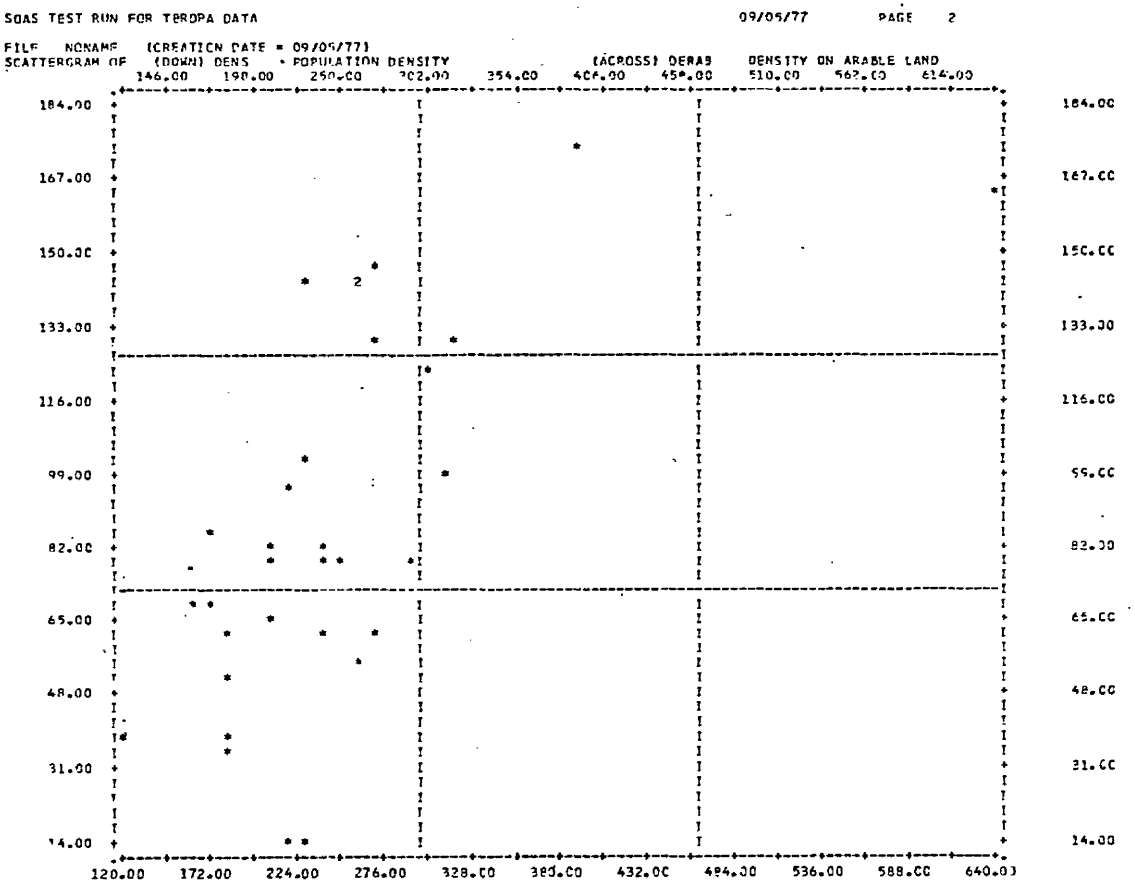


Fig. 5.10

Correlation between crude population density and density on cultivated land



STATISTICS..

CORRELATION (R)-	0.62982	R SQUARED -	0.39669	SIGNIFICANCE -	0.00006
STD ERR OF EST -	13.48799	INTERCEPT (A) -	13.94464	SLOPE (B) -	0.29684
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

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densities on cultivated land, e.g. Nqheku, Phaloane and Ramakha.

When considering the fact that between 1950 and 1976 there was a decrease in population in the areas of Nqheku and Phaloane (-47 and -23 per cent respectively) and an increase of only 12 per cent at Ramakha, it can be seen that there were signs of population pressure in these areas. On the contrary, the areas with high percentages of arable land such as Molengoane, Ponoane and Thaba Khupa had high population increases of 207, 104 and 83 per cent respectively. It can thus be stated in general that there existed push factors in areas with low percentages of arable land, and pull factors in those with high percentages of arable land. Considering the fact that high population increases were experienced even in some areas that were relatively inaccessible, where such areas had a high percentage of arable land, it can be seen that land hunger was one of the most powerful factors influencing the distribution of the rural population in Lesotho.

It is now proper to look into the position of landholdings in order to examine the distribution of land among the rural households. This is done in section 5.5.

5.5 The distribution of land for cultivation

In Table 4.6 it was shown that there was a net decrease in the area of cultivated land in Lesotho between 1950 and 1970. The discussion under section 4.2.3 pointed out that this decrease in the area of cultivated land was associated with an increase in the size of settlements and the degree of soil erosion.

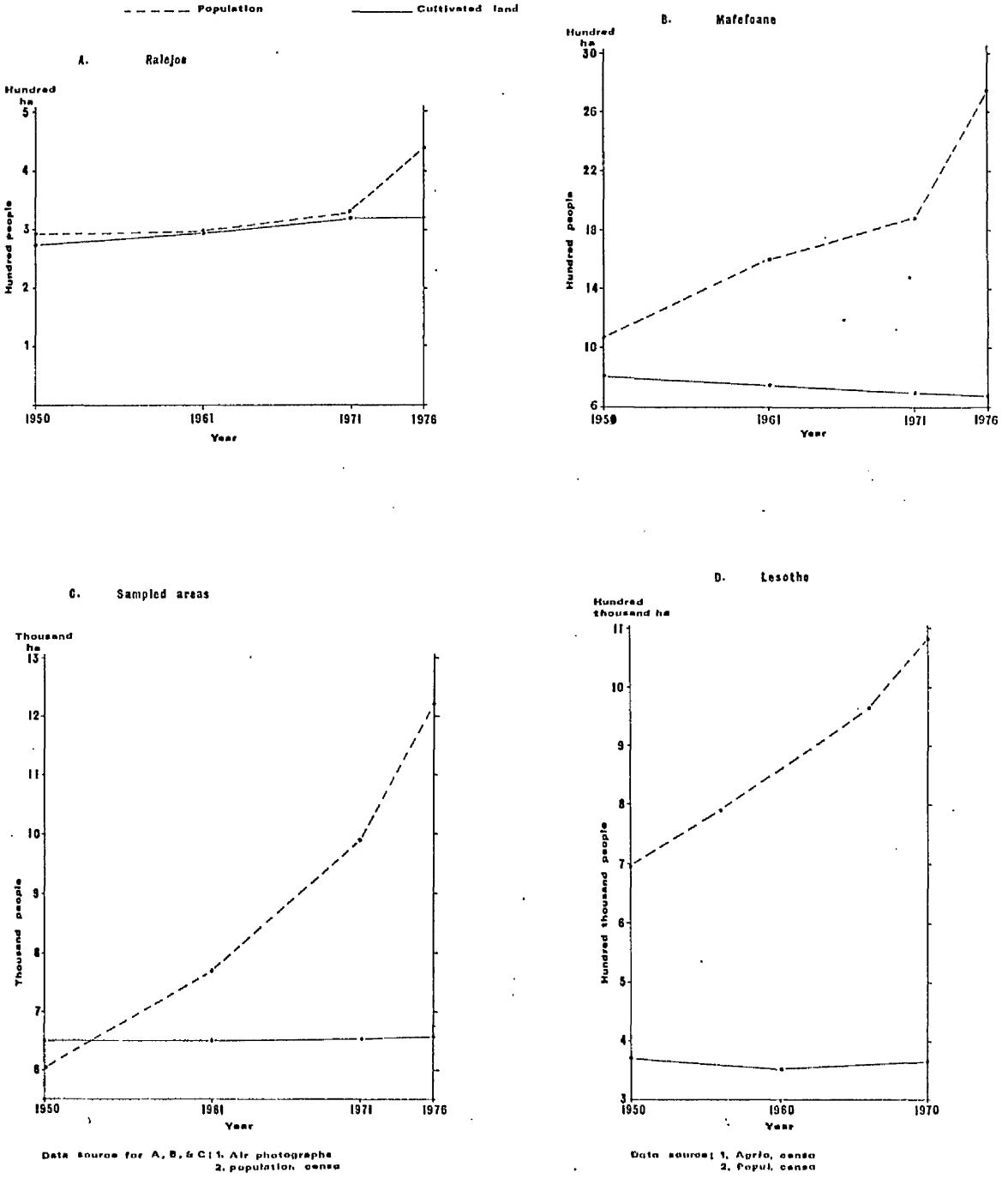
Earlier in this chapter it was revealed that there was a rapid increase in the population. The combination of an increasing rural population and a shrinking area of cultivated land (see Fig.5.11) resulted in a shortage of crop land for allocation to rural households. As stated in section 4.2.7, the result of this shortage was that fewer fields than the traditional three were allocated to recent land holders. The allocation of fewer fields has itself resulted in the decrease in the average farm size as illustrated in Table 4.9

In a desperate attempt to overcome the problem of land shortage, virgin lands were opened up for cultivation; but it was pointed out under section 4.2.3 that many of these virgin lands were marginal and, apart from the fact that yields therefrom were low, they were sooner or later abandoned because of erosion. As a result there was an increasing number of rural households that had no land for the raising of crops (see Table 2. 7).

In 1974 the mean percentage of rural households without crop land in the study area was about 13, about the same as the territorial mean of 12.7 per cent in 1970. Considering the fact that the study area was more densely populated than territorial

Fig. 5.11

Man-land ratios



Data source for A, B, & C: 1. Air photographs
2. population census

Data source: 1. Agric. census
2. Popul. census

average, a deduction can again be made that there was more arable land available in it than average.

On comparing Fig.5.12 with Fig.5.2 it can be seen that there was no association between the percentage of landless households and the rate of population growth. This is confirmed by the correlation coefficient of 0.17 at the 0.17 level of significance obtained on analysing the data of the two variables. It was stated in section 5.1 that the spatial variation in the rates of population growth were caused mainly by internal migrations. Since these migrations were governed by a number of factors (see sections 4.2.3.2 and 4.2.3.3), there was no strong inter-dependence between the differences in rates of growth and landlessness. It will also be remembered that people migrated to areas where there was available arable land, and that in these areas virgin land was opened up for cultivation. Hence, immigration as such did not necessarily lead to an increase in the number of landless households.

There was, however, a negative correlation coefficient of -0.5 between population density and percentage households with fields in the study area. This showed that the incidence of landlessness covaried positively with population density. The correlation between the incidence of landlessness and density on cultivated land was even stronger, which was again symptomatic of population pressure (cf.Figs.5.9, 5.12, and 5.13).

Besides the negligible number of landless households that operated small business as a means of subsistence, the alternative means of making a living for the landless rural households in Lesotho was share-cropping and working for a wage.

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.12

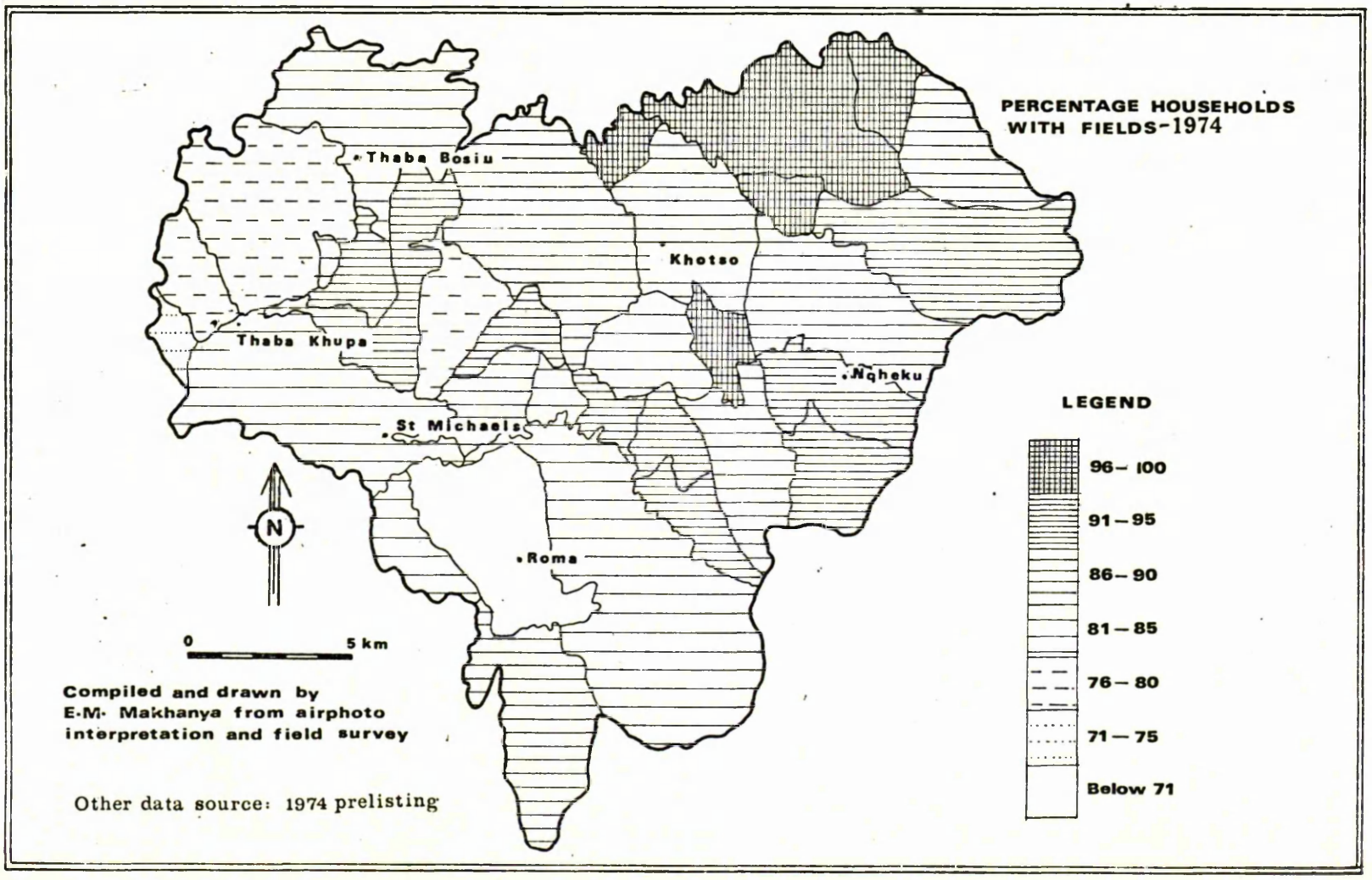
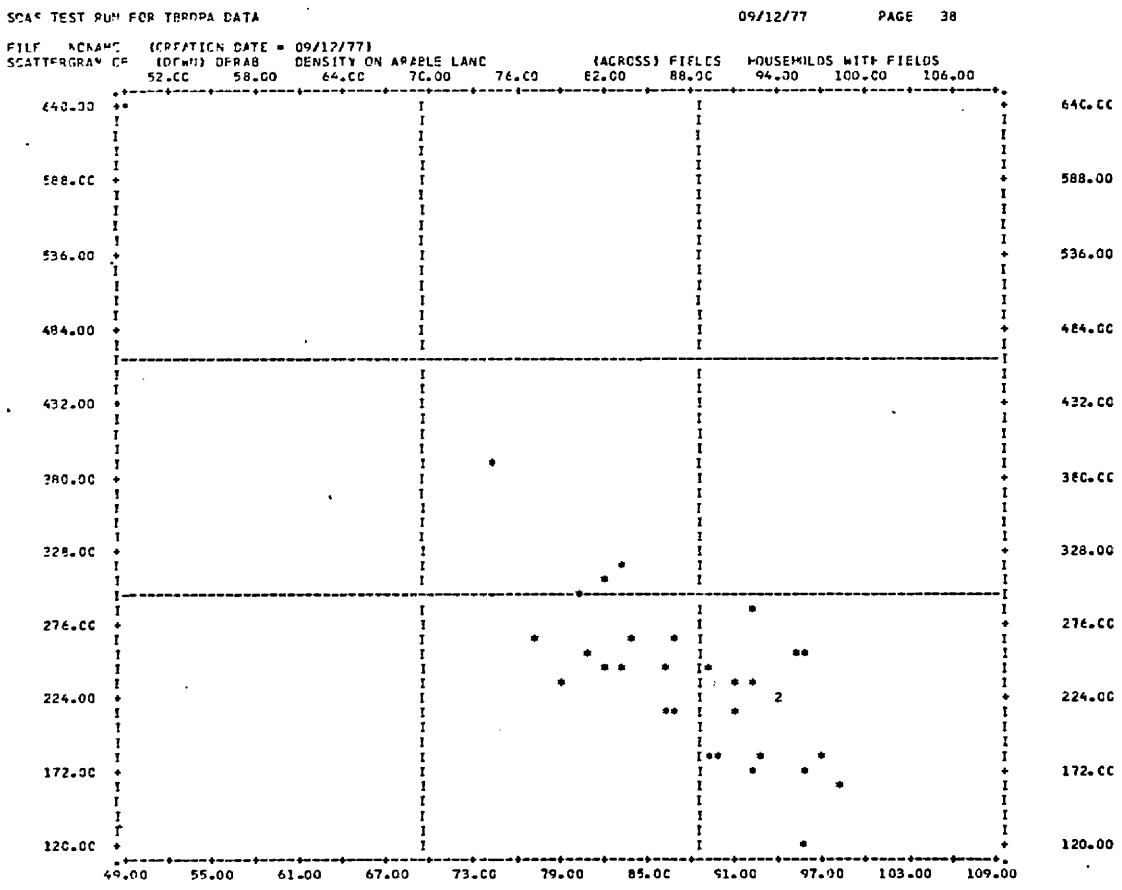


Fig. 5.13

Correlation between density on cultivated land and percentage households with fields



STATISTICS..

CORRELATION (R)-	-0.86906	R SQUARED -	0.75527	SIGNIFICANCE -	0.00001
STD ERR OF EST -	25.25413	INTERCEPT (A) -	571.04388	SLOPE (B) -	-8.31720
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

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5.6 Share-cropping as a means of subsistence

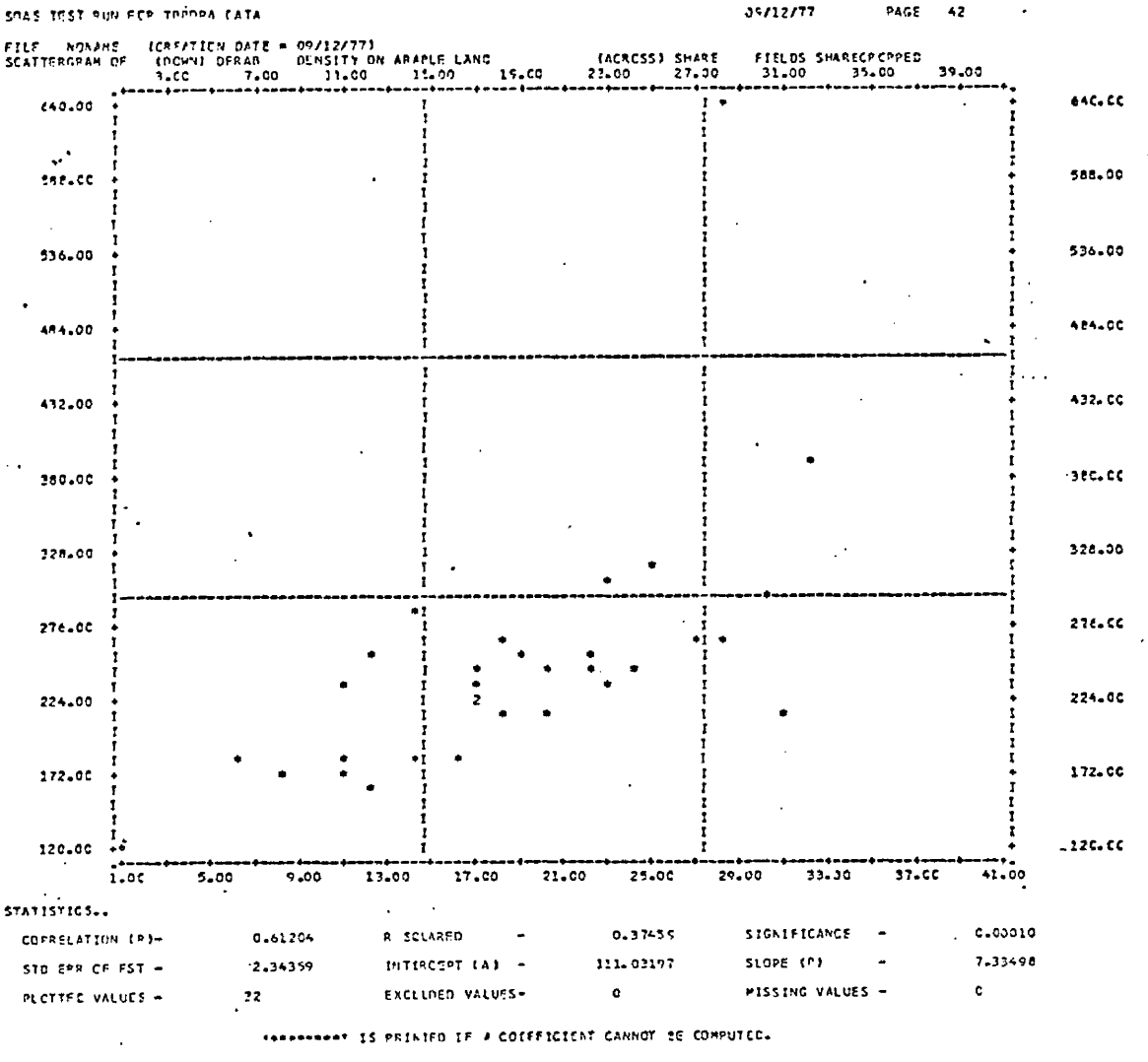
The incidence of share-cropping was discussed in detail under section 4.2.11. The discussion of this phenomenon in this section will be confined to an examination of the relationship between it and population factors with a view of ascertaining the validity of the assumption that it was one of the alternative means of livelihood for the landless.

There was a moderate positive coefficient of correlation of about 0.53 between population density and percentage fields share-cropped, and a stronger coefficient (0.61) between density on cultivated land and percentage fields share-cropped (Fig.5.14). Since it was shown earlier in this chapter that population density covaried positively with incidences of landlessness, it stands to reason that the excess households in the more densely populated areas lived on share-cropping among other things.

Fig.5.15 shows the correlation coefficient between the percentage fields share-cropped and the percentage households with fields to be about -0.58. This means that there were in general more fields share-cropped in areas where there was a high incidence of landlessness and vice versa (cf. Fig.5.16 and Fig.5.12). This association indicates that share-cropping was one of the alternative means of subsistence for the landless rural households. This was further confirmed by the fact that during the questionnaire survey about ten per cent of the respondent rural householders who reported share-cropping did not have fields of their own.

Fig. 5.14

Correlation between density on cultivated land and percentage fields share-cropped



STATISTICS..

CORRELATION (R)=	0.61204	R SQUARED =	0.37455	SIGNIFICANCE =	0.00010
STD ERR OF EST =	2.34359	INTERCEPT (A) =	111.03197	SLOPE (B) =	7.33498
PLOTTED VALUES =	22	EXCLUDED VALUES=	0	MISSING VALUES =	0

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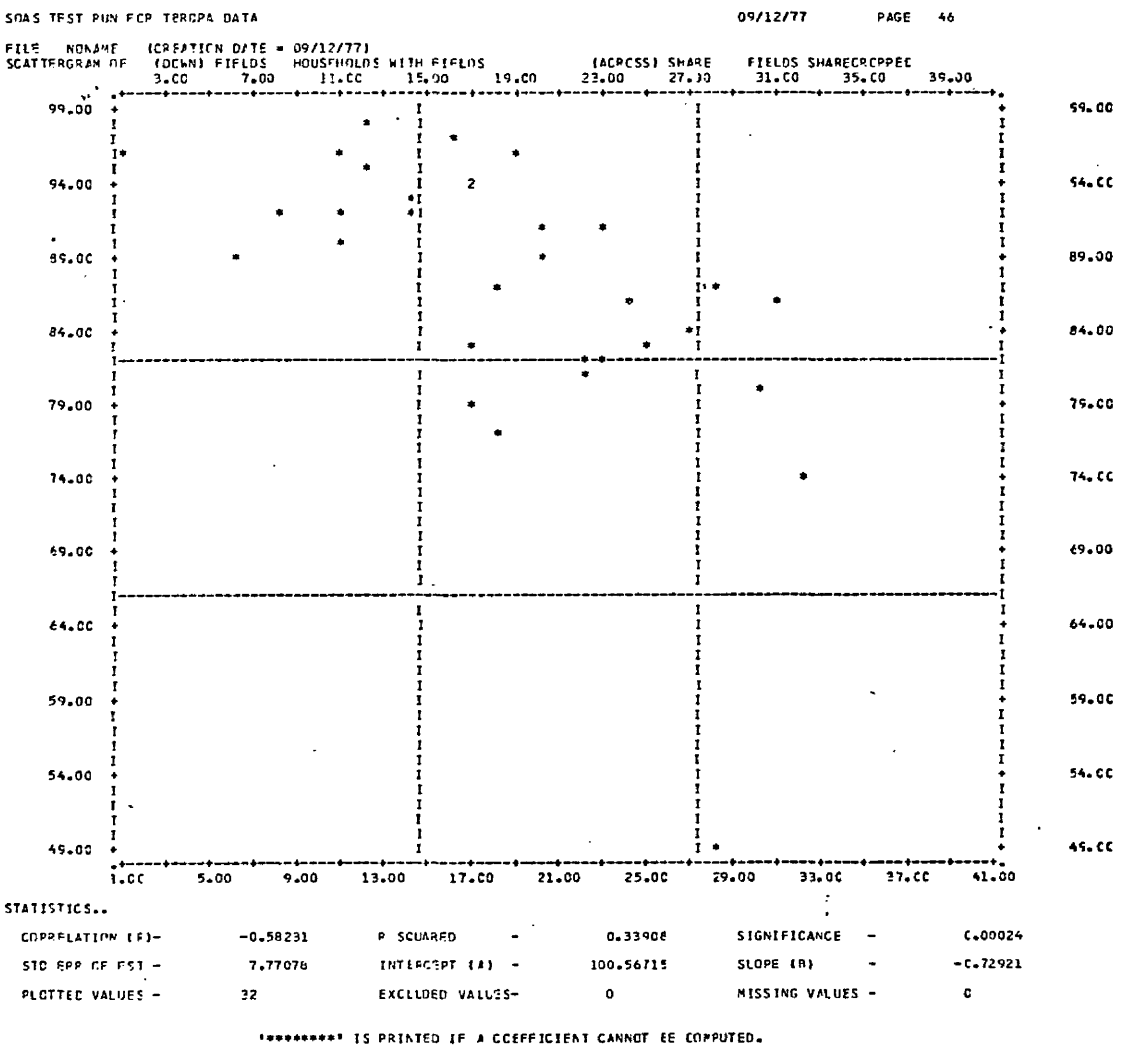
Fig. 5.15

Correlation between percentage households with fields and percentage fields share-cropped



STATISTICS..

CORRELATION (R)-	-0.58231	R SQUARED -	0.33908	SIGNIFICANCE -	0.00024
STD ERR OF EST -	7.77078	INTERCEPT (A) -	100.56715	SLOPE (B) -	-0.72921
PLOTTED VALUES -	32	EXCLUDED VALUES-	0	MISSING VALUES -	0

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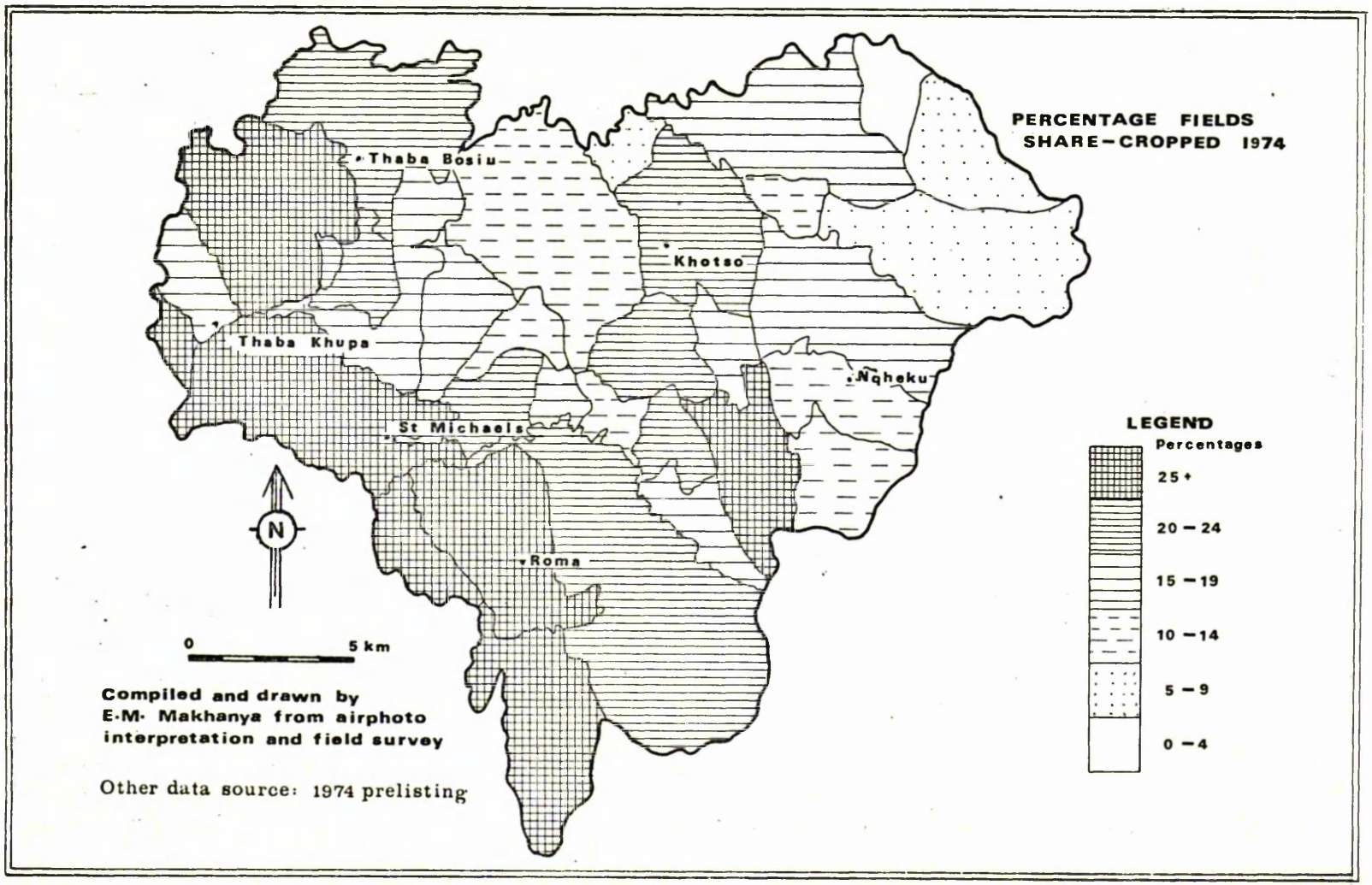
Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.16



5.7 Employment opportunities

During fieldwork for this study a detailed study on employment opportunities was made in the area of Mafefoane. Mafefoane was the only area in the study area that had a significant number of paid employees. The employers in the area of Mafefoane consisted of a university, a hospital, three schools, a seminary, a convent, a police station, a post office, an agricultural co-operative, a small scale agricultural project, about a dozen shops, and private homes belonging to the employees of these establishments. The university provided about 65 per cent of the unskilled jobs and 85 per cent of the skilled jobs. Table 5.3 shows the number of people employed in the different job categories.

Table 5.3 Estimated number of employees in the area of Mafefoane as at June, 1976, by sex and employment category.

Category	Male	Female	Total
Unskilled			
Domestic work	-	60	60
Gardening	80	-	80
Miscellaneous	300	230	530
Sub - total	380	290	670
Skilled			
Technical	40	10	50
Clerical	50	50	100
Administrative	50	30	80
Professional *	150	50	200
Sub - total	290	140	430
Total	670	430	1100

N.B. Figures have been brought to the nearest ten.

* Includes teachers, nurses, doctors, lecturers, priests etc.

Data source: Field work among employers and employees.

Although gardening is included in Table 5.3 it should be borne in mind that this occupation is seasonal in demand and many gardeners employed by private individuals were in actual fact under-employed.

At the time when these figures were compiled there was an additional 100 people (70 male and 30 female) engaged in temporary jobs. These jobs were not included in Table 5.3 because of their temporary nature. Included in Table 5.3 however, are a number of jobs that were not accessible to the villagers since they were performed by nuns, priests and bretheren as part of their religious obligation. Since the professional jobs were highly competitive, attracting workers from not only elsewhere in Lesotho but also other parts of the world, they were almost equally inaccessible to the inhabitants of the study area. It is thus more appropriate to disregard these jobs in the assessment of employment opportunities for the villagers in the study area.

From 1950 to about 1970 there has been an increase in paid employment in the area of Mafefoane as a result of rapid expansion of the university, but since future expansion of the university will most likely be situated in Maseru, the chances of further increase in the number of jobs have been diminished. Outside the area of Mafefoane the number of paid jobs offered by the few schools and shops was negligible.

The centre of jobs in the area of Mafefoane is situated in the Roma valley, surrounded by almost sheer-walled scarps that obstructed the construction of direct access routes to many of the surrounding areas. Hence, there was lack of quick and efficient

transport to many of the surrounding areas with the result that the relative distances to these areas were increased. Consequently, only about 12 per cent of the employees in the area of Mafefoane were daily commuters from the surrounding villages.

Employment opportunities in Lesotho as a whole were not bright. According to the First Five Year Development Plan the distribution of the male labour force in 1969 was such that only seven per cent were in paid employment in Lesotho; 45 per cent being employed in South Africa and 48 per cent being occupied in agriculture (Lesotho Govt. (a), 1970 p.11). At the prevailing slow rate of industrialization and comparatively high rate of population growth, this labour situation did not seem to have improved. There was thus a shortage of paid employment in Lesotho which was more felt in the rural areas. The result of the shortage of employment was that at any time of the year many land holders were absent from their holdings, working at distant centres in Lesotho or elsewhere in Southern Africa.

5.8 Crop raising as an occupation

It has been mentioned that about 48 per cent of the male labour force was occupied in agriculture. However, the actual operation of agricultural activities included both male and female labour, and the time that the males actually spent in the fields was very small. The results obtained from the questionnaire survey in the study area show the breakdown of man-hours worked on an average crop farm to be as per Table 5.4.

Table 5.4 Man-hours worked in raising crops on an average farm, under normal conditions.

Activity	Man	Woman	Son*	Daughter*	Total
Ploughing ** & planting	67	-	45	-	112
Hoeing	-	300	-	100	400
Harvesting	35	70	29	58	192
Total	102	370	74	158	704

* members of households below 18 years

** ox-drawn equipment

Data Source: Questionnaire survey.

Table 5.4 shows that only about 13 days per annum were on the average actually spent by the adult male in the raising of crops. This figure was even lower when considering the fact that about 84 per cent of the households received outside assistance in the form of helpers, share-cropping partners, or hired labour (see section 4.2.13), which would reduce the amount of time worked by the household members. The time would be

further reduced by the use of tractors. Hence, it could be concluded that many of the workers in the raising of crops were, in fact, under-employed. The inadequacy of crop raising to provide full-time employment was partly responsible for the fact that many of the energetic and able-bodied rural Basotho sought work elsewhere.

5.9 Absenteeism as an index of population pressure in the rural areas.

Absenteeism in Lesotho started as early as the nineteenth century with the discovery of diamonds (1867) and gold (1884) in South Africa. At that time Basotho were induced to go to the mines for work by the mining companies who needed their labour. There was apparently no pressing need for them to work since money had not yet become an integral part of their economy. After some time of contact with the monetary system, Basotho assimilated wants that required cash, to which the colonial administration added a system of taxation. It was pointed out in section 5.1 that the South African and British regimes intended to integrate the High Commission Territories into the labour market of South Africa. The growing needs among Basotho increased the urge to work in the mines, and during the drought periods this urge was high. With the increasing shortage of land, working in the mines has become a necessity.

In sections 4.2.7 and 4.2.8 it was shown that the income derived from the raising of crops on a farm of average size in Lesotho, under the prevailing conditions, was inadequate. In order to illustrate this point further, reference is made to a study of poverty in Lesotho conducted by Marres and van der Wiel in 1974. According to this study the monthly costs of maintaining a rural household of five persons at a minimum subsistence standard was R67.02 (Marres and v.d.Wiel 1975 p.89). Since the calculations of farm incomes made in section 4.2.8 were also based on the 1974 prices, and since there was not much difference between the five persons per household estimated by Marres and v.d.Wiel and the4.4 persons per household used in

this study, a comparison could be made between the estimated income from crop raising and the poverty datum line (P.D L.) or R67.02 per month in Table 5.5

Table 5.5 Net annual income from raising crops on an average farm (2 ha)*, assuming one crop per agricultural year.

Crop	Gross margin from yield Rands	P D L Rands	Deficit Rands
Maize	22.4	804.24	781.84
Sorghum	32.0	804.24	772.24
Wheat	41.4	804.24	762.84
Beans	101.6	804.24	702.64
Peas	90.0	804.24	714.24

* The actual average farm size in the study area was 1.7 ha

Data source: see Table 4.12

According to Table 5.5 there was a very wide gap between the estimated P D L and the estimated income from raising crops at the prevailing level of production. Even double cropping of any combination of the crops in Table 5.5 could not bring earnings from crop raising anywhere near the P D L. without a change in the rate of production.

Table 5.5 illustrates very vividly that many rural Basotho could not live on crop raising alone on the average farm under the prevailing rate of production. In fact only one per cent of all farm adults were regarded as deriving adequate income from agriculture (Ward 1974 p.73). It was therefore essential, in many cases, that at least one member of the household found paid employment to augment the meagre income from crop raising.

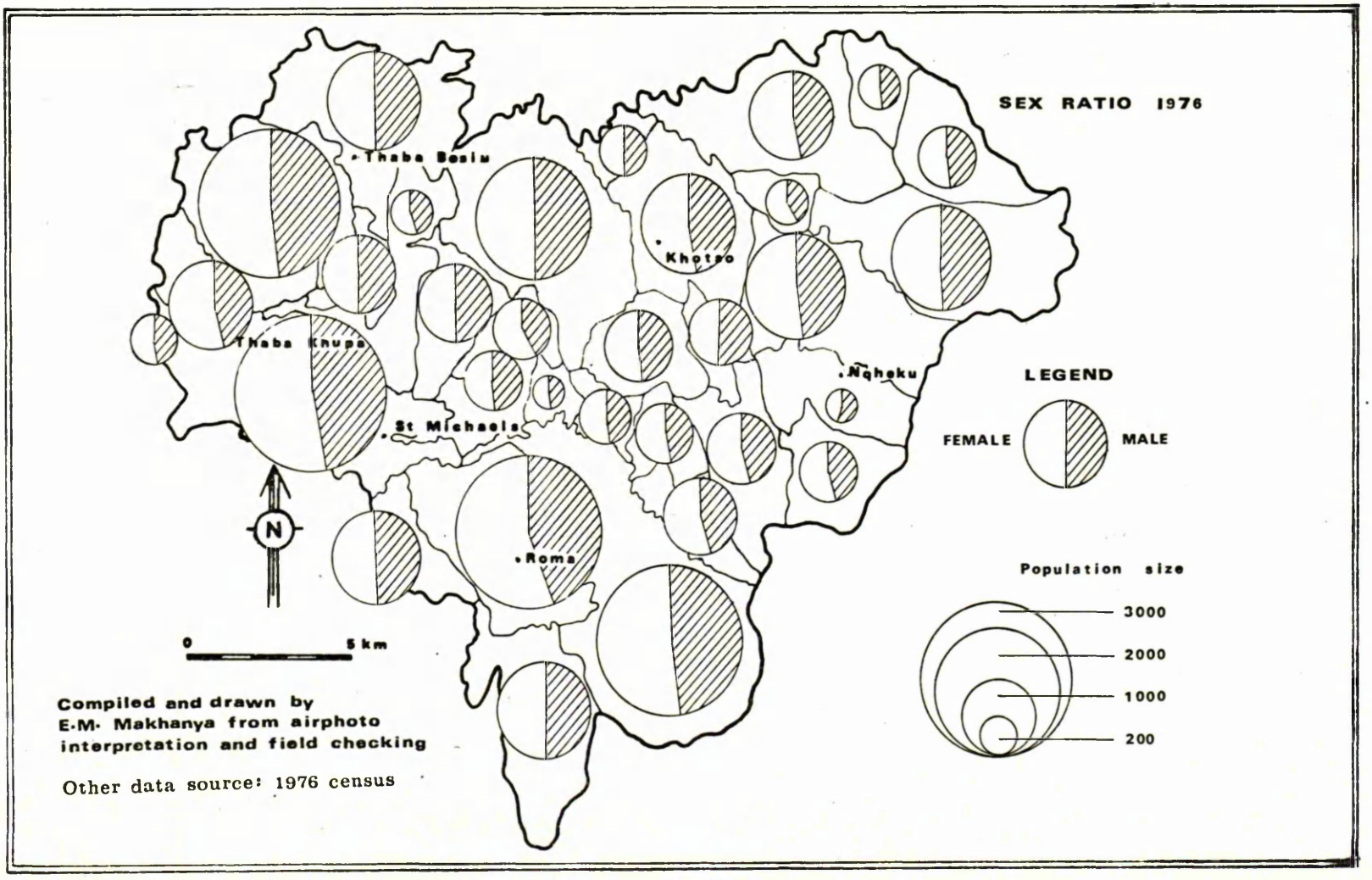
In many cases it was the household head that had to find the job; the result being a chronic incidence of absentee land holders as reflected in Fig.2.9 and 2.10. Finding a job was more essential among the landless households. McDowall (1973) states that among the migrants to South African mines 49.7 per cent were those who did not have land, 22.2 per cent had one piece of land, 17.6 per cent two pieces of land, and only 10.5 per cent had more than two pieces of land.

It could thus be concluded that the absence of people from their rural holdings resulted from (a) the inadequacy of agriculture to provide full-time employment (b) the inadequate income derived from the raising of crops (c) landlessness and (d) lack of paid employment in or near the rural areas themselves.

Although absenteeism itself did not significantly affect the production of crops, it was regarded by those involved in rural development as an obstruction to the implementation of some projects. Since the people left on the farm could not take certain decisions on land that did not belong to them, many plans of agricultural development were delayed and production techniques were not carried out. The most obvious result of absenteeism was the unbalanced sex ratio found in many rural areas. The de jure sex ratio in the study area was, for instance, about 92 males to 100 females (Fig.5.17) as against the de facto ratio of 76 males to 100 females. The consequences of the absence of a number of male heads on the well-being of their families and the communities in which they lived need not be over emphasised. In various publications the churches, government, and individual writers expressed concern about the

Thaba Bosiu Rural Development Project Area (Area 1)

Fig. 5.17



migrant labour system, but there was no positive step taken either to halt or to discourage it because migration to the mines resulted from "push" factors over which there was no immediate control.

5.10 Summary

Although there was marked zonal variation in the distribution of population in Lesotho, it was generally evenly distributed over comparatively small rural areas, such as the study area. This was mainly because of the general principle of equity in the distribution of cultivated land held in Lesotho, which made the number of people at any place proportional to the area of available arable land. As a result of this principle of equity in the distribution of cultivated land there was on the whole no significant change in the spatial pattern of population distribution between 1950 and 1976.

There was general shortage of land in areal terms which was indicated by the high densities on arable land, the presence of rural households without land, and the high incidence of the practice of share-cropping. The shortage on land was caused mainly by a growing population that had few alternative means of livelihood besides the raising of crops. The rate of population growth in Lesotho, as reflected in the censa, appears to have fluctuated between 1891 and about 1956. This was mainly because of the unrestricted movement of people across the borders with South Africa at that time, which seems to have acted as a safety valve during periods of depression in Lesotho. Since about 1956, and associated with the introduction of tighter laws governing the influx and movement of Africans in South Africa, the rate of growth has more or less stabilized at about 2.2 per cent compound. At this rate the population will double in about 32 years time.

The population growth rate in the study area was higher than

the territorial average because of net immigration into it resulting from internal migrations. Rural households migrated from areas of distress characterized by shortage of arable land or lack of access to social services such as schools, health centres, shops and transportation means, to relief areas. While this rural to rural type of migration took place, some people found relief by either migrating to the urban areas in Lesotho or going to seek paid employment in South Africa. On the whole migrations to South Africa indicated a failure of the local resources to meet the needs of the people.

Basotho working in South Africa as migrants were forced to leave their families behind because of the regulations governing their employment contracts. This condition was unacceptable to responsible bodies in Lesotho, and only tolerated by the migrants and their kin, because of its adverse socio-economic effects on the communities from which the migrants came. The fact that the migrant labour system was continued in spite of its ill-effects shows that there was a more pressing need to find employment than to safeguard other interests. Considering the fact that about ten per cent of the population of Lesotho were absent from the territory for the purpose of finding employment, it can be seen that the soil and water resources of the country, managed as they were, were not able to support the prevailing levels of the rural population.

CHAPTER 6

SUMMARY AND CONCLUSION

The main findings of the thesis can be related to the themes of first, changes in the extent of crop land, secondly, changes in the extent of soil erosion, thirdly, changes in man/land ratios and fourthly, changes in productivity. Using the methods of air-photo interpretation and field observation it was possible to establish a number of hypotheses related to the first three themes. Population and agricultural censa were also very useful complements to airphoto interpretation in the examination of changes in the man/land ratios. The examination of changes in productivity was made possible mainly by the use of past statistical data and the questionnaire survey. The purpose of this chapter is first to summarize the findings of the study and secondly, to examine future prospects in the use of land for agriculture in Lesotho.

6.1 Background to the economic factors affecting the use of land resources in Lesotho

Lesotho has remained an island of economic under-development in the relatively prosperous South African economy on account of the lack of mineral and agricultural resources, the neglect by the colonial administration, and the failure of traditional practices to make rapid adjustments to the money economy of neighbouring South Africa which arose with the discovery of gold and diamonds. Lesotho's economic development was further hampered by the fact that it was an enclave in South Africa. On top of the general problems that face all landlocked states, Lesotho had a unique problem of being an enclave in a racist country. For although South Africa provided Lesotho with a number of economic benefits such as employment for Lesotho's population, markets and marketing facilities for Lesotho's produce, import facilities, currency etc. there was a racial barrier between the two states that was an obstacle to the full realisation of these economic benefits by Lesotho. For instance, Basotho mine workers, like all other black workers in South African mines, received such meagre wages that they could hardly engage in farm and other investments. Their jobs provided little security in that their contracts were short. They could also not enjoy the fellowship of their families while working in South Africa, a factor which tied them to their rural holdings in Lesotho. It is against this background that the use of land resources in Lesotho had to be viewed.

6.2 Agricultural land resources and their use

Agriculture was the mainstay of Lesotho's economy, with about 85 per cent of the population dependent on it. Of the agricultural activities, crop raising was the most important because most rural households derived a living from it. Production of crops was, however, at a subsistence level and was characterised by low and fluctuating yields. Low crop yields in Lesotho were associated with a number of factors and, as demonstrated in chapter four, the most significant of these factors were adverse climatic conditions, soil erosion and poor management of the agricultural land resources.

Since dry land farming was the norm in Lesotho the most devastating climatic element to crop raising was the erratic nature of the rainfall. Not only did the rain come at an inopportune period in the cropping season causing considerable crop failure, but there were frequent periods of actual drought with which the farmers could not cope due to their financial and technological limitations. It was demonstrated in chapter four that crop production in Lesotho fluctuated largely with the amount and timing of the rainfall. It was also shown that unseasonable frost and hail were other climatic factors that frequently caused crop failure in the territory.

The rainfall often came in thunder showers that were erosive on the friable soils of the bare and rugged landscape. Soil erosion was endemic throughout Lesotho, and it caused the depletion of soil fertility which in turn resulted in low yields. Results from airphoto interpretation in the study area showed that about

60 per cent of the land was severely eroded, and that although sheet erosion was more widespread the gully type of erosion was more serious.

It was found that, apart from observing the method of ploughing along the contours, the farmers made little, if any, individual effort at soil conservation. At the same time they continued to cultivate land that was susceptible to erosion, thereby causing acceleration of the erosion process. A comparison of the land use and soil erosion maps of the study area showed that about 37 per cent of the cultivated land was situated in areas that were subjected to severe erosion and that, in the absence of conservation measures, these areas posed an erosion hazard. It was further shown that the cultivation of areas that were unsuitable for cultivation resulted from the opening up of virgin land for cultivation which was itself caused by the demand for more land for allocation to a growing rural population.

Cultivation was below standard mainly because the farmers did not have money to obtain the necessary input requirements. It was found, for example, that

(a) although the farmers showed a tendency to apply more fertilizer in their fields than they did in the past, the amount of fertilizer used still fell short of the requirements,

(b) whereas seeds were sold to the farmers at a subsidized rate by the agricultural co-operatives, many farmers still used low grade seeds obtained from previous harvests and

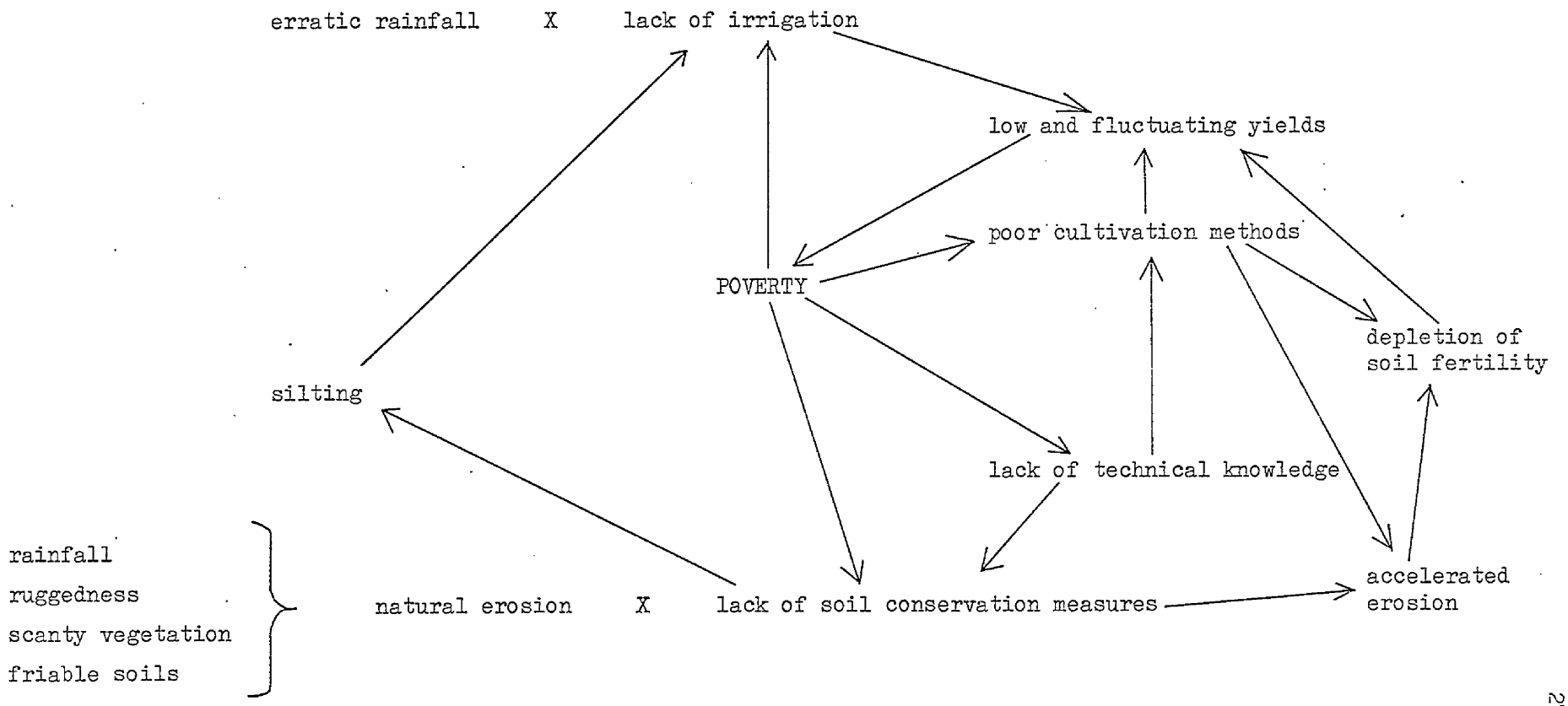
(c) only ten per cent of the households had used a tractor for more than five years, and there was widespread use of

primitive hand tools in the raising of crops.

There was such a close inter-relationship among the different factors associated with low crop yields that it was difficult to consider any one in isolation. They were jointly and in a complex manner responsible for low crop yields as illustrated in the attached diagram. For instance, although the erratic nature of rainfall was found to be largely responsible for low and fluctuating yields it was actually the absence of irrigation that was to blame. Lack of irrigation resulted from lack of capital, lack of technology, and the difficulties presented by silting; silting being a product of soil erosion. As already explained, soil erosion in Lesotho was a natural product of intensive rainfall, ruggedness, lack of vegetation cover and friable soils. Soil erosion was viewed as one of the main causes of low crop yields because it caused the depletion of soil fertility by removing the top soil. The rate of soil erosion was, however, determined by the level of management of the agricultural resources which, as was demonstrated in chapter four, was low in Lesotho. Poor management of agricultural land resources in Lesotho resulted from the fact that the farmers lacked both capital and skill to cope with the difficulties presented by the physical environment.

The raising of crops in Lesotho was therefore associated with a number of vicious circles, at the centre of which was poverty. The task of overcoming these vicious circles was made more difficult by yet another vicious circle related to population growth. It was demonstrated in chapter five that, in the absence of alternative means of making a living, the rapid growth of the rural population resulted in high densities on arable land which,

Inter-relationship of the factors associated with low crop yields in Lesotho



in turn resulted in the diminution of the average farm size and smaller amount of production per head. It was further demonstrated in chapters four and five that at the prevailing low rate of crop yields, and given the type of crops raised in Lesotho, income derived from the raising of crops in an average farm was not enough to maintain an average rural household even at a minimum subsistence level. As a result it was essential that at least one member of each household, it was found that this was usually the male head, took up off-farm work to augment the meagre income derived from the raising of crops. It was shown in chapter five that, apart from being inadequate in the production of food, the average farm also provided little gainful occupation to the rural population; and because there was lack of alternative jobs at home many people were forced to seek paid employment at distant places, thereby causing a situation of large scale absenteeism in the rural areas.

Despite the absence of essential members of the farming population, those left behind continued to raise crops in the normal way. This was achieved because of the communal way of life of rural Basotho. In chapter four it was demonstrated how households in which the members that were left behind could not cope with the normal tasks of raising crops were assisted by relatives, share-cropping partners or hired individuals. This was true also of households that did not have the necessary means of raising crops. Since in this study there has been no observable difference in yield between owner-cultivated fields and fields cultivated by outside assistants, it could not, as explained in chapter four, be said that absenteeism was itself responsible for low yields. But the absence of land holders

from their rural holdings was regarded as an obstacle to the implementation of rural development projects because those left behind were often not in a position to take decisions in matters relating to the land of absentees.

6.3 The interaction between population and the agricultural land resources

Because most rural households depended largely on the raising of crops for their livelihood, there was a greater concentration of people in the more level lowland and foothill zones where, as was demonstrated in chapter five, there was a higher percentage of arable land. It was explained in chapter four that apart from sheer 'land hunger', the other factors causing a higher concentration of people in the lowland and foothill zones were first, the proximity to places of employment and secondly, the easy access to social services.

There was within the rural areas noticeable migration from areas of distress to areas of relief, which may be interpreted as resulting largely from geographical inertia. Among the man/land ratio variables discussed in chapter five there were four that provided vital statistics concerning the interaction between population numbers and the land resources for crop raising. These were :

(a) density on cultivated land

(b) incidence of share-cropping

(c) landlessness

(d) estimated migration

A summary of the means and standard deviations of these four variables is shown in Table 6.1 The correlation coefficients obtained in the bivariate regression analyses of these variables is summarized in Table 6.2.

Table 6.1 Summary of the means and standard deviations of the vital statistics variables

Variables	Mean	Standard Deviation
Density on cultivated land	2.47 / ha	89.99
Households with fields	86.94 %	9.36
% fields share-cropped	18.47 %	7.59
Estimated migration	4.31 %	36.29

Source: Data collected by the author in 1976

Table 6.2 Summary of the bivariate regression analyses of the vital statistics variables

	Density on cultivated land	% HH with fields	% fields share-cropped	Estimated migration
Density on cultivated land	1.00	-0.87	0.61	0.31
% HH with fields	-0.87	1.00	-0.58	-0.16
% fields share-cropped	0.61	-0.58	1.00	0.19
Estimated migration	0.31	-0.16	0.19	1.00

HH = households

Source: Data collected by the author in 1976

Multiple regression analyses of these variables showed the most significant results when density on cultivated land was used as a criterion variable. The prediction equation obtained was

$$y = 843.143 - 7.252\ x_1 + 1.776\ x_2 + 0.398\ x_3$$

where y = density on cultivated land

x_1 = percentage households with fields

x_2 = percentage fields share-cropped

x_3 = estimated migration.

r^2 was about 0.794, meaning that about 79 per cent of the spatial

variation in the densities on cultivated land could be explained by this linear regression equation. This equation was used to calculate densities on cultivated land in the study area; the results obtained were correlated with the observed densities, i.e. those shown in Fig.5.9. A correlation coefficient of 0.88 and r^2 of 0.782 were obtained (see appendix G).

It was demonstrated in chapters four and five that apart from migrating within the rural areas, rural people also migrated to the urban areas of Lesotho as well as to the industrial areas of South Africa. Whereas the internal migrations may generally be interpreted simply in terms of geographical inertia, migration to South Africa was rather restrained. It was not only temporary in nature, but it also did not include the relocation of the entire households of the migrants. Instead, it caused a chronic situation of absence among the rural land holders that, as stated in chapter five, hampered both the work of rural development projects and the normal family life of the rural population. Considering the meagre wages earned by the migrants and the short contracts that they were offered, migrant labour did not provide a long term solution to the areas of distress from which the migrants came. The fact that Basotho still migrated to work in South African industries, in spite of the hardships they incurred by so doing,was only symptomatic of shortage of remunerative activity based on local resources.

At the prevailing annual growth rate of 2.2 per cent compound, Lesotho's population will double in about 32 years time. Since there was a high correlation between population change and change in densities, density figures were also expected to double

in 32 years and, unless more jobs were created and the use of agricultural resources improved, the situation will deteriorate.

6.4 Attempts made to improve the use of agricultural resources in Lesotho

Efforts made by the colonial administration to improve agricultural production in Lesotho were confined mainly to soil conservation and, according to figures published in the different colonial reports, large sums of money were spent on this project. As reported in the colonial reports, the methods used in soil conservation were mainly concerned with the mechanical diversion and slowing of run-off. They comprised the laying out of contoured terraces, introduction of contour ploughing, construction of earth dams and the planting of trees and grass.

In 1950 Corona (p.369) reported that there was considerable success in soil conservation measures, and that this was made possible by the support which had been readily offered by the Paramount Chief and the tribal authorities. The colonial administration seemingly adopted a policy of propaganda and explanation aimed at winning over the support of the chiefs through whom the villagers were instructed to observe the soil conservation measures. These measures were further given legal basis under the Native Administration Proclamation (Corona 1950 p.369), and were included in the Laws of Lerotholi.

It was evident from all the air photographs that the method of ploughing along contours was observed almost without exception where the slopes were inclined. There was, however, very little evidence of success in tree planting and dam construction. Sheddick's account of tree planting in Lesotho indicated that some opposition was offered to some of the tree planting schemes

and that this opposition was sometimes offered by the chiefs (Sheddick 1954,pp.122-124), which was contrary to the account given in Corona that the colonial administration enjoyed ready support of the chiefs in implementing soil conservation measures. Subsequent colonial reports were pessimistic about success in soil conservation. They tended to put the blame squarely on the villagers, whom they regarded as unco-operative and unwilling to change their attitude towards land use (H.M.S.O. 1958, p.10). In short, the colonial administration's effort at soil conservation in Lesotho was not successful and the land was generally still not adequately protected against erosion.

The failure by the colonial administration to implement soil conservation measures was, as stated in the colonial reports, indeed partly due to the fact that there was little support from the villagers. It was, however, mainly the methods of approaching the villagers that were at fault. The colonial administration believed in doing the job for the villagers without them being involved and without giving them enough information on what was being done. It relied on the chiefs and the law to enforce co-operation among the villagers. With insufficient knowledge of the benefits of the soil conservation measures, the villagers resented what they thought were apparently unnecessary inconveniences to their traditional practices. This negative attitude, arising from insufficient knowledge, was expressed during the questionnaire survey by a few farmers. These farmers indicated, among others, that they did not appreciate the usefulness of wide grass strips between land parcels because they regarded them as minimizing the size of their land parcels. They did not seem to understand that

the wider the grass strips the more effective they were in giving protection against erosion. Wallman's book (1969) gives a more detailed exposition of Basotho's negative attitude towards conservation works that were implemented without them being sufficiently informed and involved.

Part of the failure of the colonial administration's effort at soil conservation stemmed from the use of faulty methods of conservation. Apart from the work of Staples and Hudson (1938) there was little evidence that surveys were conducted before the actual implementation of conservation works and many of the conservation measures had a mechanical rather than an ecological basis. Consequently they were short-lived.

With independence a new line of approach to rural development was adopted. Socio-economic research was regarded as basic prerequisite to sound planning, and it became the declared policy of government to encourage involvement of the whole body of the people in development projects (Lesotho Government (a) 1970, p.41). The rural development projects were further extended to include the development of not only physical resources but also the socio-economic aspects of rural areas. The rural development projects that came after independence worked within this framework, and the villagers have since exhibited remarkable co-operation with the projects. This sudden change of attitude among the villagers was not in accordance with the allegation that Basotho were unwilling to change their attitudes towards rural land use. Not only was there ready acceptance of cash crop innovations, but the villagers were even prepared to work collectively in crop raising such as was demonstrated in the potato scheme of the Khomokhoana project.

6.5 Prospects for the future

At this stage it would be appropriate to refer to the work of the Thaba Bosiu Rural Development Project in the study area to determine its impact on agricultural land use and, using it as a yardstick, thereby examine the future prospects of agriculture in Lesotho. First of all it should be pointed out that the villagers in the Thaba Bosiu Rural Development Project area were reported to have thus far given full support to the proposed land use and conservation plans (TBRDP 1974, (c) and (d) p.1, Ellithorpe 1976,pp.1-3). At Ratau (see Figs. 1.3 and 3.1 for its location) the area in which the Thaba Bosiu Rural Development Project had started to implement the land use and conservation plans when fieldwork was undertaken for this study, the villagers were actually working in the fields in co-operation with the projects. During the questionnaire survey the villagers of Ratau also showed remarkable calm and understanding, which meant that they were thus far at ease with the work of the project.

Apart from being based on the entire river basin, the conservation works of the Thaba Bosiu Rural Development Project included, among others, the construction of grass waterways and gabion structures. They were thus ecologically based and, with good care, should provide a long term solution to soil erosion. Progress in the implementation of the conservation plan has, however, been very slow and the cost very high. It seemed that new strategies had to be adopted in order to make the implementation of the techniques throughout the study area economically feasible.

The land use plan of Ratau (Fig.6.1) showed that crop land of the villages of Ratau, Matlangoane and Sekete were to be reduced in area from about 927 ha to 885 ha (TBRDP 1974 (c), p.4). The 42 ha difference were put out of use because they were regarded as unsuitable for cultivation. On the other hand it was found in the study of the land use of Ratau that the extent of cultivated land had actually been increasing between 1950 and 1976 (Table 6.3, Fig.6.2)

Table 6.3 Land use at Ratau, by period and size (ha)

Year	Cultivated	Settlements	Grazing	Total
1950	1260	262	1210	2732
1961	1260	262	1210	2732
1971	1324	272	1136	2732
1976	1324	272	1136	2732

Data source: Air photographs

This confirmed the statement that virgin land that was opened up for cultivation was largely marginal and only posed a hazard to erosion. According to the land use plan of Khotso (see Matela in Figs 1.3 and 3.1) crop land would be reduced from 862 ha to 841 ha (TBRDP 1974 (d), p.4).

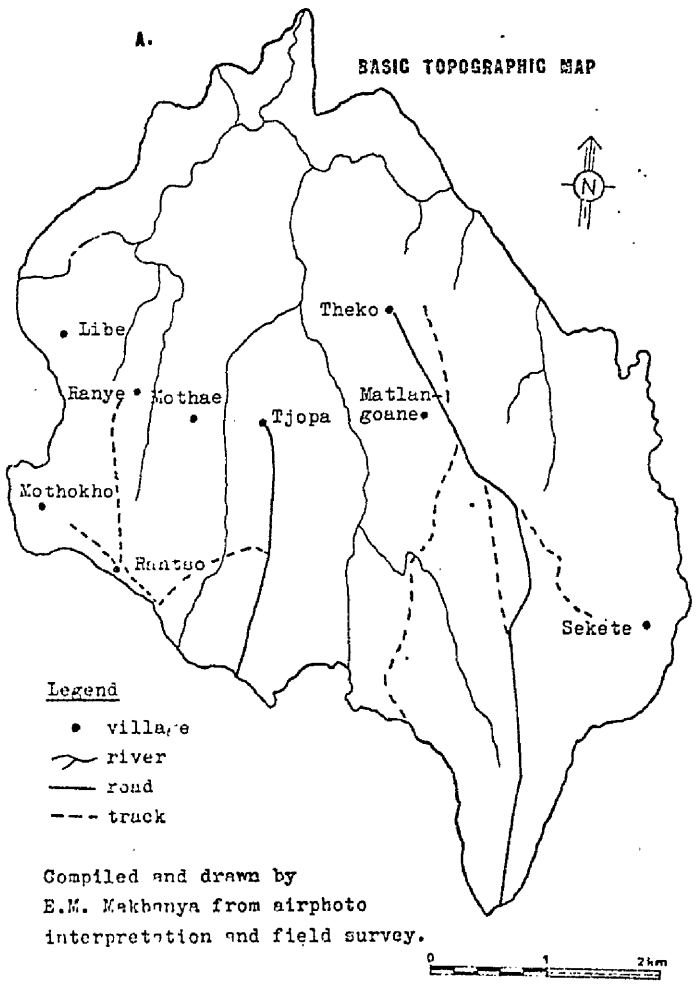
Table 6.4 Soil erosion at Ratau, by class, type and extent

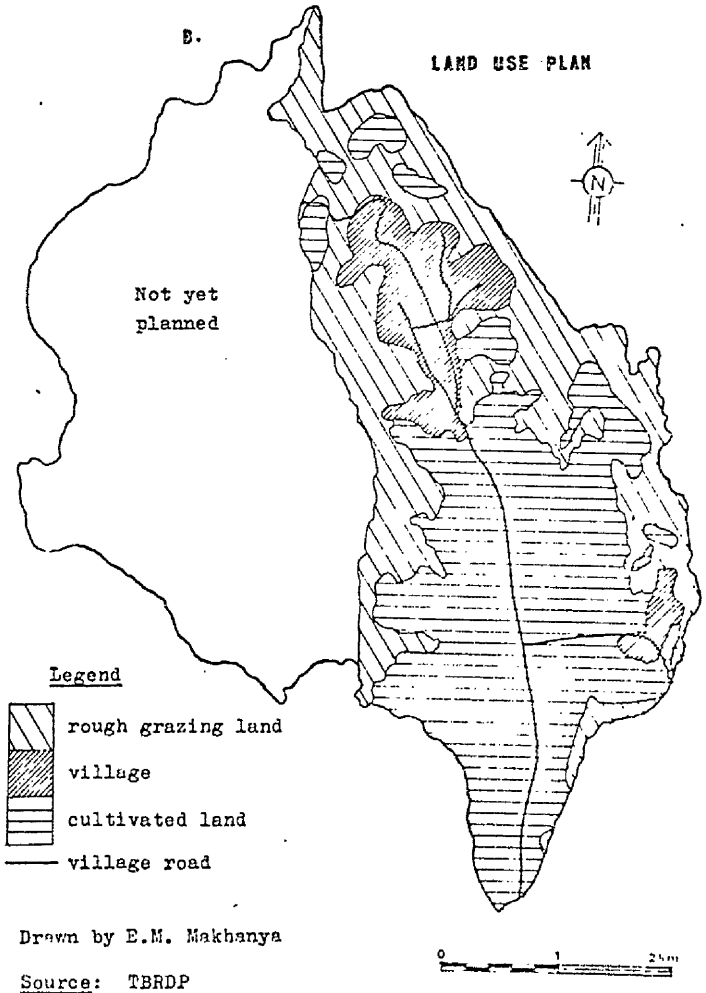
Class	Sheet		Gully		Total	
	ha	%	ha	%	ha	%
Slight to moderate	1532	56	-	-	1532	56
Severe to very severe	880	32	320	12	1200	44
Total	2412	88	320	12	2732	100

Data source: Air photographs

RATAU

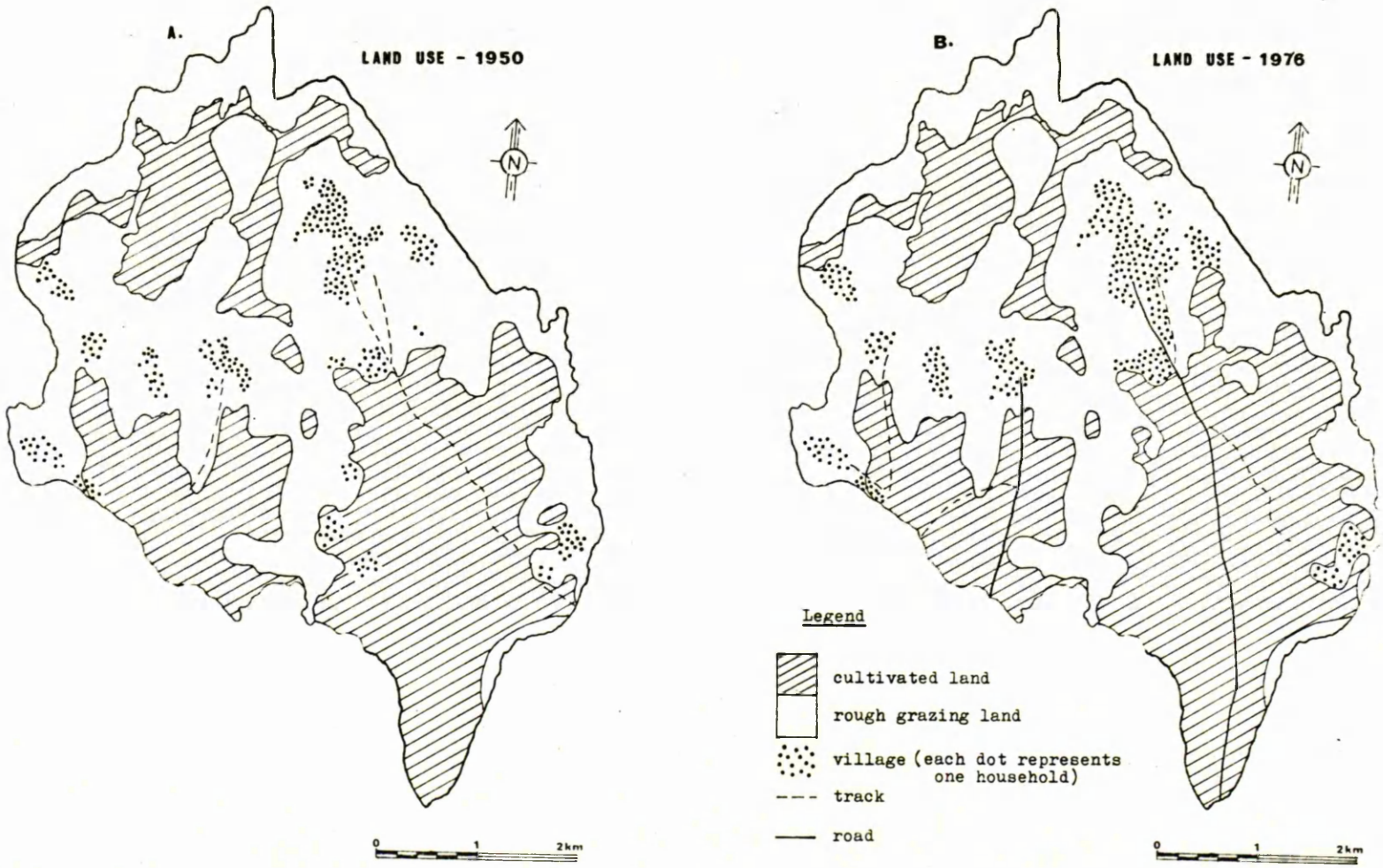
Fig. 6.1


A.
BASIC TOPOGRAPHIC MAP
N
Libe
Theko
Ranye
Mothae
Tjopa
Matlan-
goane
Mothokho
Rantuo
Sekete
Legend
village
river
road
track
Compiled and drawn by
E.M. Makhanya from airphoto
interpretation and field survey.
0
1
2km


B.
LAND USE PLAN
N
Not yet
planned
Legend
rough grazing land
village
cultivated land
village road
Drawn by E.M. Makhanya
Source: TBRDP
0
1
2km

RATAU

Fig. 6.2



Compiled and drawn by E.M. Makhanya from airphoto interpretation and field checking.

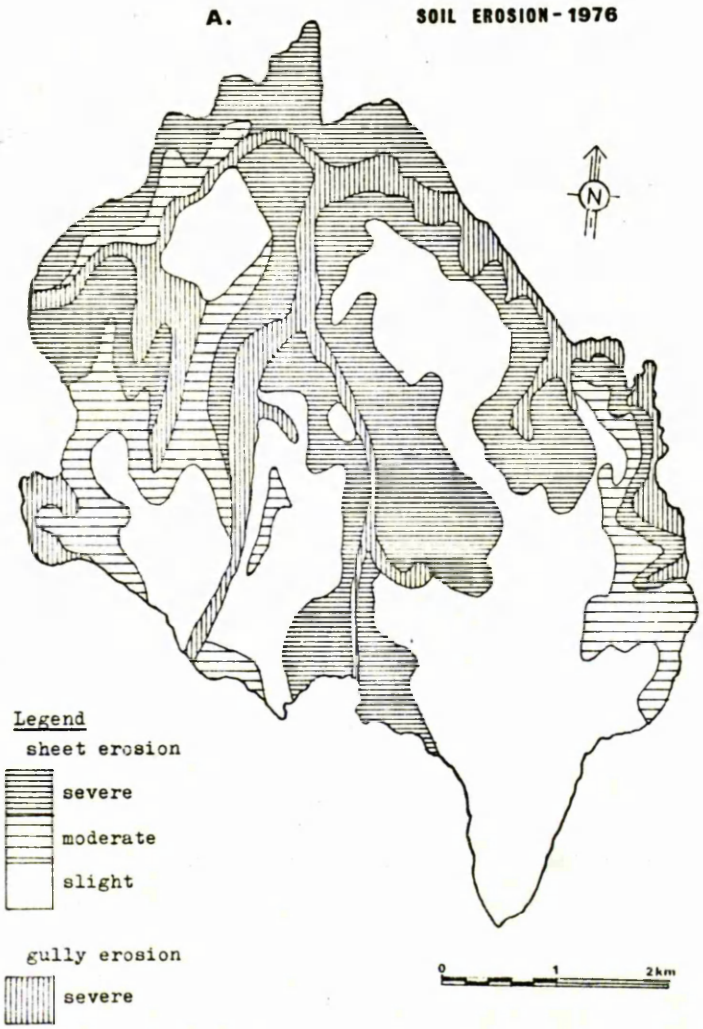
Table 6.4 shows that about 1,200 ha or 44 per cent of the total area of Ratau was seriously eroded. About 26 per cent of these seriously eroded areas were under the plough. It seemed that the TBRDP will succeed in improving the condition in about 80 ha, leaving some 232 ha or 19 per cent of the seriously eroded areas as hazard areas (Fig.6.3). However, if the plan was carried out to the letter, these hazard areas could be used for orchards and woodlots.

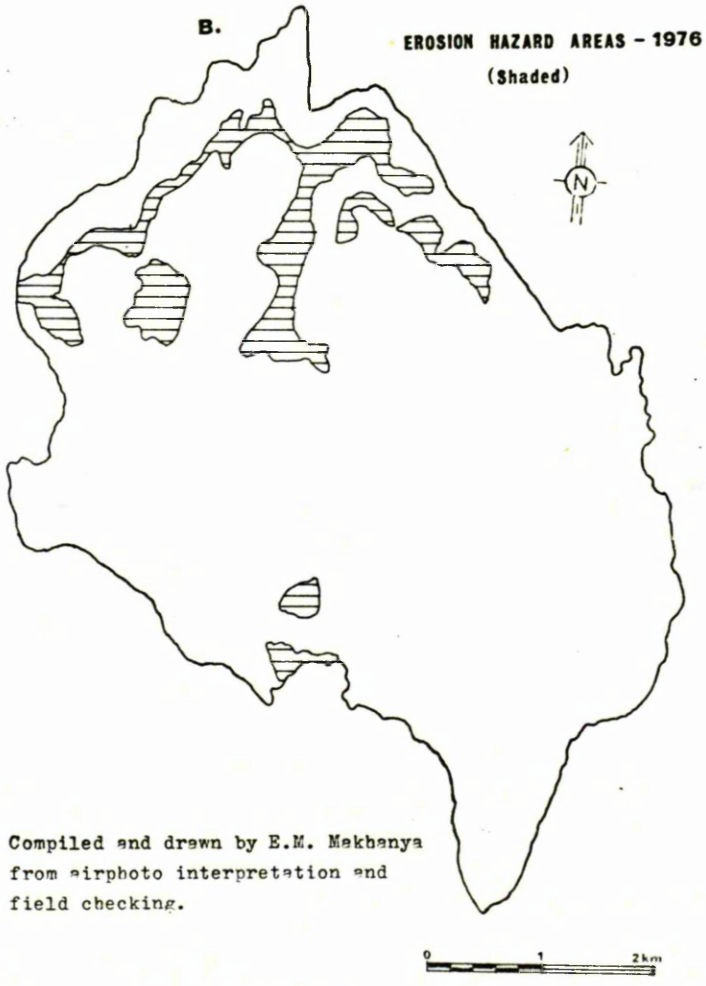
Judged by the standards of the study area, Ratau had good prospects for the future. The area had low densities on arable land, low population increase rate, low percentage of landless households, about average percentage of fields share-cropped, and a much higher per capita farm size (see Figs. 5.2, 5.9, 5.12 and 5.16). The situation was bad in the other parts of the study area and, bearing in mind that the study area was found to be above average in the state of well-being among the rural areas, it was worse in many parts of Lesotho. It would therefore require increased effort, in many of these areas, to implement land use and conservation plans at the same level of efficiency as at Ratau.

The ultimate aim of the Thaba Bosiu Rural Development Project was to increase production income and employment on the land (TBRDP 1974 (a), p.1). Since the land use and conservation plans of both Ratau and Khotso demonstrated that the area of crop land could not possibly be increased, and in chapters four and five it was shown that this was the general situation in Lesotho, increased production could be brought about only by intensive crop raising. There was thus far unanimity among

RATAU

Fig. 6.3





Compiled and drawn by E.M. Makbanya from airphoto interpretation and field checking.

the different writers and advisers to the government of Lesotho on the need for the consolidation of fragmented land holdings as a means of increasing productivity. The idea has also been adopted as government policy and, since the villagers at Ratau were reported to have given full support to its implementation in their area (Ellithorpe 1976, pp.1-3), the prospects for implementing it throughout Lesotho were good. But on the grounds of the discussions under section 4.2.8 the consolidation of land parcels would in itself not provide a solution to the low and fluctuating production in crops.

Under the prevailing man/land ratios and generally poor economic conditions in Lesotho, intensive crop raising that could be most effective would require a change to cash crop raising which would in turn require increased inputs in the form of seeds, fertilizers, irrigation, soil conservation,etc. Since it was demonstrated in chapter five that most farmers were poor and therefore could not afford these inputs, it was obvious that there was a need to find alternative means of increasing inputs in the raising of crops. There were three such possible options:

(a) the present farming system could be retained, and the individual farmers given assistance in the form of money and skill whereby their level of farm management could be boosted. Given limited financial resources and the complicated structure of rural society, the government of Lesotho could, however, not lend sufficient of both technological and financial assistance individually to all farmers in the territory. Although the government of Lesotho continually received foreign aid for agricultural and rural development, among other purposes, such aid rarely benefited the individual farmer directly because of

first, the inadequacy of such aid and secondly, the lack of mechanisms by which the farmer could gain access to it. Without any collateral securities and with uncertain prospects for success in crop raising, it was also very difficult for the farmers to raise any loans individually.

(b) The second alternative is the one proposed by most of the writers cited in this thesis, namely, that there should be a change from the communal to the individual or freehold system of land tenure. This suggestion was based on the idea that the communal system of tenure was one of the causes of low productivity because it was thought that it provided little security of tenure to the users of the land. It was claimed that the system of individual land tenure would provide more security of tenure and therefore also an incentive to increased productivity. But since it was shown in chapter four that there was no cause to think that low crop production in Lesotho was related to insecurity of land tenure this argument did not hold.

It was also argued that individual tenure would bestow monetary value to rural land and that this was desirable in providing incentives to productivity. The attachment of monetary value to rural land could, however, produce a number of negative effects in Lesotho, inter alia:

(i) Because most rural Basotho were poor, the chances were that if land was made marketable many would be rendered landless, either because they were unable to purchase land or because they sold it in times of need. There being few alternative ways of making a living, the marketability of land would only lead to increased hardship among rural Basotho.

(ii) Since there would be less competition in the land

market, those with purchasing power could easily accumulate land with the idea of either sub-letting it or just speculating; the latter would have a negative effect on crop production.

(iii) It was stated under section 4.2.6 that the idea of inalienability of land in Lesotho arose from bitter historical experiences, and Basotho were still wary about it. Hence, while the system of individual ownership of land could possibly attract foreign investments in the agricultural sector, there was general fear that large tracts of the scarce agricultural land could easily fall into the hands of foreigners and thereby create obstacles to rural development akin to those experienced by other African countries (Lesotho govt. 1976, p.3). The fact that neighbouring Swaziland experienced these problems served as a constant reminder, thereby aggravating Basotho's fear of the alienation of land. In short, the prevailing socio-economic conditions in Lesotho did not favour a change to the system of individual land tenure.

(c) A third means of increasing inputs in farming is collectivism. Collective crop raising could be managed by either the government or groups of farmers supported by the government.

Without describing in detail the different options that could be adopted in collective farming, there were in general obvious advantages that the system could bring to crop production in Lesotho. Among these were that:

(i) Collective farming could create a medium through which foreign aid received by the government could be used to improve the management of agricultural resources at the grass-roots level, a need which was not adequately met under the prevailing arrangement

in which the actual raising of the crops was left to the individual farmer.

(ii) It would make possible the utilization of skills of trained Basotho agriculturists in the actual process of production. Under the prevailing system these men and women were confined mainly to office work and extension services.

(iii) Collectivism would create economies of scale that would make it comparatively easy to implement mechanisation, irrigation, soil conservation and other improved methods of farming.

(iv) Manual labour displaced by mechanisation could be directed towards labour intensive irrigation and soil conservation projects. More jobs would be created by the establishment of secondary industries that would be made possible by bulk production.

(v) Bulk buying and selling that would result from collective farming would minimize costs and maximize income from agriculture. It would also make it relatively easy to secure markets.

(vi) Under collectivism,land use and conservation planning could be done on a regional basis, allowing for specialisation in the different farming activities. This would provide a solution to, among others, one of the biggest problems to rural land use in Lesotho, namely that of grazing control.

There were already favourable conditions for collective farming in Lesotho, namely:

(a) The land was owned communally.

(b) Rural Basotho were still very communal in their way of living

(c) Basotho farmers had already demonstrated co-operation

in a number of projects organised by the agricultural co-operatives, and in the potato scheme of the Khomokhoana project co-operation had gone beyond the co-operatives' idea of just pooling resources and was very near to the idea of collectivism as advocated here.

6.6 Conclusion

In conclusion it may be stated that up to the mid 1970's the agricultural land resources were not effectively managed in Lesotho, because their management was left largely in the hands of farmers who were technologically and financially handicapped to cope with the rather harsh physical environment. As a result production in crops was low and fluctuated mainly with the prevailing weather conditions. There being few alternative means of making a living in the territory, the inadequacy of crop production was aggravated by the rapid growth of the rural population.

Efforts to improve the management of the land resources for agriculture have thus far shown little positive effects. This was mainly because the strategies adopted did not aim at the core of the problem, namely, the poverty of the users of the land. In order that the difficulties experienced in farm management could be eliminated or at least alleviated, there was a need for agrarian reforms; the type of reforms needed being those that could cause an increase in inputs necessary for increased productivity. Considering the prevailing socio-economic conditions of rural Basotho, it is suggested that collective farming would be a most appropriate and efficient way of improving the level of management of the agricultural land resources.

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APPENDIX B

THABA-BOSIU RURAL DEVELOPMENT AREA (AREA I)

LIST OF VILLAGES

Land allocation area	Village	Map reference*
Boinyatso		B 5
	Boinyatso	C 5 (near Nobi)
	Khokhotsaneng	B 4
	Lisheane	C 5
	Machai	C 5
	Makoili	C 5
	Maliele	C 5
	Mokhitli	D 5
	Monyakoane	A 4
	Motheoaneng (Seeiso)	B 4
	Nobi	C 5
	Rankoletsi	D 5
	Sekete (Maja)	A 4
	St Michael	C 5 (near Nobi)
	Thola	C 5
	Tsiki	C 5
Jobo		B 3
	Jobo	C 2
	Lihaseng (Tsoeneng)	B 2
	Likhalile (Ralikhalile)	C 2
	Lioling	B 2
	Majoro (Matebeleng)	B 2
	Mosalla (Mothebesoane)	B 3
	Ntlo Kholo	B 3
	Sekantsi (Makotoko)	A 2
	Sekoting (Thaka Makhooa)	B 2

* Reference to Fig.1.3

Land allocation area	Village	Map reference*
Mafefoane		D 6
	Lehloba	D 5
	Lerata	D 5
	Liphakoeng	D 5 (near Lerata)
	Mafefoane	E 6
	Matsoai	D 5 (near Lehloba)
	Mokhosi	D 6
	Mokuoe	D 5
	Motoko	D 6
	Ntsibane	D 6
	Tsunyane	E 6
Makeneuoe		F 5
	Koaleli	F 6
	Kokami	G 6
	Khoitintle	F 5
	Lillane	F 6
	Sekhantso	F 6
Makhabane Makotoko		G 2
	Boinyatso	G 2
	Mofammere	G 3
Makhalanyane		A 4
	Makhalanyane	A 4
Makotoko Makotoko		G 2
	Magrika	G 1
	Maimana	G 1
	Makhale	F 2
	Matjeka	H 1
	Metolong	G 1
	Ntainyana	H 2
	Rachere	F 2

* Reference to Fig. 1.3

Land allocation area	Village	Map reference *
Maloto		F 5
	Malimong	F 4 (near Motjoka)
	Motjoka	F 5
Masupha Maama		C 6
	Maama	C 6
	Makafane	D 6
	Mokoma	C 6
Masupha Makotoko		H 2
	Masupha	H 2
Matela		F 2
	Khotso (Matela)	F 3
	Moji	G 3
	Mpiti	F 2
Matete/Lebamang		D 7/E 7
	Lebamang	E 7
	Mabathoane	E 7
	Malimong	D 7
	Moling	E 7
	Morema	E 7
	Phillipi	E 7
	Patrick	E 8
	Samosamo	E 7 (near Mabathoane)
Mohalenyana		D 4
	Khubetsoana	D 3
	Mohalenyana	D 3
	Rapheko	D 3
	Tumahole	D 3

* Reference to Fig.1.3

Land allocation area	Village	Map reference*
Molengoane		F 4
	Molengoane	F 4
Mothobi		I 3
	Lelala	I 3
	Mokete	I 3
	Nkhema	I 4
	Rankoane	I 3
	Sephooko	I 3
	Thoteng	H 3
Mpao (Pekosela)		D 3
	Mpao	D 3
Musuoe Theko		G 4
	Lethena	H 4
	Majoro	G 5
	Mapale	G 3
	Matono (Mosuoe)	G 3
	Mphukhe	G 3
	Nazareth	G 3 (near Rankota)
	Rankota	G 3
	Seoehlana (Mapheleba)	H 4
Nqheku		H 4
	Nqheku	G 4
Nqosa		F 2
	Nqosa	F 2
Ntsane		C 3
	Ntlama	C 3
	Ntsane	C 3

* Reference to Fig. 1.3

Land allocation area	Village	Map reference*
Ntsi		E 4
	Makatseng	F 4
	Manganeng	F 4
	Maphatsoe	F 4
	Motleleng	F 4
	Ntsi	F 4
Phaloane		E 4
	Phaloane	E 4
Ponoane		E 4
	Ponoane	E 4
Rabotsoa		I 2
	Rabotsoa	I 2
Ralejoe		D 4
	Kubutu	D 4
	Ralejoe	D 4
Ramakha		C 3
	Ramakha	C 3
Ramotsoane		G 5
	Makhetha	G 5
	Ramotsoane	G 5

* Reference to Fig. 1.3

Land allocation area	Village	Map reference*
Ratau		E 3
	Libe	D 2
	Mothae	D 2
	Mothokho (Rantso)	D 3
	Matlangoana	E 3
	Rantso	D 3
	Ranye	D 2
	Sekete	E 3
	Tjopa	E 3
Thaba Bosiu		B 2
	Khoabane	C 2
	Mahaheng	C 3
	Mathula	D 2 (near Potso)
	Potso	D 2
	Qiloane	C 2
	Thibakhoali	B 2
Thaba Khupa		A 3
	Joele	A 3 (near Lesoiti)
	Lesoiti	A 3
	Liotsanyana	A 3
	Mohalenyane	A 3
	Sekoabetla	A 3
	Thaba Khupa	B 3
Tloutle		F 6
	Elia	F 7
	Hill Crest	E 7
	Khobeng	E 5
	Kholoko	F 7
	Khubetsoana	F 7
	Maphoteng	E 6
	Manyooe	F 7

* Reference to Fig. 1.3

Land allocation area	Village	Map reference
Tloutle (Continued)		
	Mochesane	E 6
	Pae-lea-itlhatsoa	E 5
	Seqoma	E 5
	Shale	E 6
	Thota-peli	E 6
	Tloutle (Mpiti)	E 6
Tumahole		G 5
	Majoro	G 5
	Tsoili	G 5
	Tumahole	G 5

APPENDIX C

STUDY: THABA-BOSIU RURAL DEVELOPMENT AREA - 1976

QUESTIONNAIRE

Enumerator code [1 2]

Date [5 6 7 8]

Village code [3 4]

Serial No [9 10 11]

Card No. [12] 1

Question	Remarks	Answer
1. Where do you live?	Village code	In this village [13]
2. How long have you been living here?	actual figure (years)	[14 15]
3. Where did you live before you came here?	0= not applicable 1= town 2= rural area	[16]
4. Why did you choose to live here?	1= near a road 2= near a school, hospital etc. 3= more fertile 4= have relatives here 5= land scarcity 6= no reason 7= other reason	[17 - 19]
5. How many huts do you have in your homestead	actual no.	[20 - 21]
6. How many people live with you?	actual no. over 18 years over 18 years below 18 years below 18 years	[22 - 25] men female male children female children

7. How many members of your family live away from home because of work?	actual no. all ages	male / female — 26 - 27
8. How many of these work in the Republic of South Africa?	actual no. all ages	male / female — 28 - 29
9. What type of work is each person doing?	1= skilled 2= unskilled 3= semi-skilled 4= clerical 5= technical 6= administrative.	male / female — 30 - 35
10. How often do you share crops with someone else?	1= never 2= sometimes 3= always	36
11. In how many parcels of land do you raise crops at present?	actual no.	own parcels / someone else's / shared parcels / other — 37 - 40
12. How many acres of land do you have altogether?	actual no.	own parcels / someone else's / shared parcels / other — 41 - 46
13. How many of YOUR land parcels are outside your chief's area?	actual no.	47

14. Have all your parcels of land remained the same size since you arrived here?	1= none 2= some 3= all		48 - 50
		remained the same	
		become bigger	
		become smaller	
15. Why have they become smaller?	0= no 1= yes		51 - 57
		not applicable	
		gave part to son	
		gave part to relative	
		because of erosion	
		chief took some back	
		because of marshes	
		other	
16. Why have they become bigger?	0= no 1= yes		58 - 59
		because of re-allocation	
		other	
17. How many people ploughed your fields last time?	actual no.		60 - 68
		father	
		mother	
		sons	
		daughters	
		partners	
		hired individuals	
		govt.labour	
		project labour	
		other	

18. How many harvested your fields?	actual no.		69 - 77
		father	
		mother	
		sons	
		daughters	
		partners	
		hired individuals	
		govt.labour	
		project labour	
		other	
19. In cultivating your fields, how long have you used the following?	1= five years 2= five years 3= used but discontinued 4= never used		78 - 80
		tractor	
		oxen	
		hand tools	

Digit code 1 2 3 4 5 6 7 8 9 10 11 | | | | | | | | | | | |

12 card no. 2

20. What is the main source of your seed?	1= self 2= neighbour 3= govt. 4= project 5= merchant 6= other		13 - 19
		maize	
		sorghum	
		wheat	
		barley	
		oats	
		beans	
		peas	
21. What is the source of your fertilizer?	1= none 2= dung 3= neighbour 4= govt. 5= project 6= merchant 7= other		20 - 22

22. What is the cause of crop failure in your field?	1= pests 2= lack of rain 3= too much rain 4= cold, frost 5= poor soil 6= other	23 - 26
23. Do you ever lose soil in your field because of erosion?	1= never 2= occasionally 3= continually 4= dont know	27
24. Are there any people in your area who have had to abandon their fields because of erosion?	1= none 2= few 3= many 4= dont know	28
25. How effective do you think the following measures are for controlling erosion?	1= never tried 2= never seen 3= not effective 4= successful 5= very effective 6= dont know	29 - 35 dams grass strips terraces diversion furrows grassed water courses trees grazing control
26. How many livestock do you own at present?	actual no.	36 - 50 cattle including calves sheep including lambs goats including kids horses including foals donkeys including foals pigs including piglets

27. How many fowls do you own at present?	actual no.		51 - 53
28. How much was your last harvest?	actual no. (tins)	maize sorghum wheat barley oats beans peas	54 - 65
29. Would you regard this last harvest as normal, high or low?	1= high 2= normal 3= low	maize sorghum wheat barley oats beans peas	66 - 72
30. Is any of your total land under fallow at present?	actual no. (acres)	own shared other	73 - 78

Digit code 1 2 3 4 5 6 7 8 9 10 11 | | | | | | | | | | | |

card no. 12 | 3 |

31. Why are you not cultivating it?	1= minor problem 2= serious problem		13 - 19
		no money	
		lack of labour	
		practising rotation	
		low yields	
		no rain	
		too much rain	
		other	
32. How much land did you irrigate this year?	actual figures (acres)		20 - 23
		own parcels	
		someone else's	
		shared parcels	
		other	
33. What do you normally do with your produce?	1= consumed entirely by family 2= sell some to private individuals 3= sell some to merchants 4= sell some to marketing co-operative		24 - 33
		maize	
		sorghum	
		wheat	
		barley	
		oats	
		beans	
		peas	
		chicken	
		eggs	
		wool	

			34 - 43
34. Why do you choose to dispose of your produce in this manner?	1= more profit 2= small yield 3= no market 4= no transport 5= tradition 6= it is law	maize	
		sorghum	
		wheat	
		barley	
		oats	
		beans	
		peas	
		chicken	
		eggs	
		wool	

Appendix D.

Data collected in the area of Mafefoane, recorded in coding forms

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1 20		1 13022		4230400000		131		10 0 0 2		1 1	0	00022		11734	111
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1 206		1 13007		2331120201		301		10 0			0	00001		01012	111
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13105 2113 112	46123 1355	53555 4	0 0 0 3 1	13018	9 33	3
13105 2 6	12 1444	4444444 0	0 0 0 0 0	0	
1106 23 1 2	12 3344	44444 4	0 0 0 0 2	321	1 3	3
1106 211 1 1	12 1464	44446 0	0 0 0 0 2	818 6	1 33	3
1106 211 5 4	1 3 3345	55234 0	0 0 0 0 2	4	2	3 15
1106 211 114	3 1355	43355 4	0 0 0 5 0	8	24 11	3
1106 255 4 1	1 3355	43356 0	0 0 0 0 0	012	12 3	3
1106 211 1 1	1 3 1355	23545 2	0 0 2 0 1	107260	15 13	3
1106 211 1 2	3 1355	33545 8	8 0 2 0 0	03048	12 33	3
1106 255 5 4	123 6355	66455 0	0 0 0 0 2	0 27	2	
1206 211 1 5	13 63333	53355 1	0 0 2 2 7	600	24	1
1206 211 1 5	123 6 6335	54655 8	0 0 3 3 1	53018	2 33	1
1206 211 1 5	123 6233	55655 0	0 0 0 0 0	0 2	18 3	2 2
1206 211 1 5	12 2335	55655 0	4 2 0 0 2	5 24	3 2	3
1206 211 3 1	12 61335	55655 0	0 0 0 0 2	4	12	3
1206 211 1 4	12 3345	55655 5	10 5 1 1 3	904830	18 33	3
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13105 3 111 1 11 222 2 22
13105 3 4 only cells neg.
1106 3 1 1 21 2 2 22
1106 3 1 1 11 2 2 22
1106 32 111 11 11 222 22 22
1106 3 22 4 11 11 1 22
1106 3 11 1 11 12 2 22
1106 3 11 3 11 12 2 22
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APPENDIX E

THABA BOSIU RURAL DEVELOPMENT PROJECT AREA (AREA I)

POPULATION FIGURES

Area	Area (ha)	Population		% population change 1950—1976	De jure sex ratio M/100 F
		1950	1976		
Boinyatso B 5	2532	1363	3311	143	88.7
Jobo B 3	2070	1382	2564	86	92.7
Mafefoane D 6	1690	1065	2764	159	81.2
Makeneuoe F 5	538	272	510	88	81.3
Makhabane Makotoko G 2	330	132	231	75	72.7
Makhalanyane A 4	194	128	340	165	88.9
Makotoko Makotoko G 2	1910	534	992	86	87.7
Maloto F 5	586	265	462	74	88.6
Masupha Maama C 6	682	745	882	18	94.7
Masupha Makotoko H 2	494	163	193	18	91.1
Matela F 2	1462	518	1120	116	89.4
Matete/Lebamang D7/E7	1718	590	1078	83	100.1
Mohalenyana D 4	710	733	731	- 0.3	100.2
Molengoane F 4	372	172	528	207	104.7
Mothobi I 3	2090	425	1475	247	93.5
Mpao D 3	386	137	313	128	73.9
Musuoe Theko G 4	1828	726	1477	103	89.3
Nqheku H 4	974	250	132	-47	120.0
Nqosa F 2	294	160	251	57	96.1
Ntsane C 3	478	350	683	95	97.4
Ntsi E 4	738	442	720	63	90.3
Phaloane E 4	223	176	135	- 23	92.9
Ponoane E 4	275	193	394	104	97.9
Rabotsoa I 2	1099	147	362	146	93.6
Ralejoe D 4	530	295	440	49	98.1
Ramakha C 3	1063	132	148	12	85.0
Ramotsoane G 5	927	318	345	8	85.5
Ratau E 3	2732	1250	1694	36	96.6
Thaba Bosiu B 2	2080	655	1128	72	95.4
Thaba Khupa A 3	655	519	949	83	86.9
Tloutle F 6	3891	1510	3055	102	93.4
Tumahole G 5	1099	372	724	95	84.4
Study area	36650	16119	30131	87	91.5

The codes after the names of the areas are map references to Fig.1.3

Source: 1. Air photo interpretation
2. Population censa 1956, 1966 and 1976

APPENDIX F

THABA BOSIU RURAL DEVELOPMENT PROJECT AREA (AREA I)

MAN/LAND RATIO FIGURES

Area	% HH with fields 1974	Population density people /km^2	Density/ha on cultivated land	% fields share-cropped 1974
Boinyatso B 5	83	131	3.2	25.4
Jobo B 3	80	124	3.0	29.7
Mafefoane D 6	49	164	6.4	28.3
Makeneuoe F 5	94	95	2.2	16.9
Makhabane Makotoko G 2	98	70	1.6	11.7
Makhalanyane A 4	74	175	3.9	31.7
Makotoko Makotoko G 2	97	52	1.8	15.6
Maloto F 5	91	79	2.1	20.4
Masupha Maama C 6	84	129	2.7	26.7
Masupha Makotoko H 2	96	39	1.2	1.4
Matela F 2	86	77	2.4	24.0
Matete/Lebamang D 7/E 7	87	63	2.7	27.7
Mohalenyana D 4	79	103	2.3	17.3
Molengoane F 4	96	142	2.6	18.9
Mothobi I 3	92	70	1.7	7.9
Mpao D 3	92	80	2.9	13.7
Musuoe Theko G 4	87	81	2.1	17.9
Nqheku H 4	92	14	2.3	10.9
Nqosa F 2	96	85	1.7	11.0
Ntsane C 3	91	143	2.3	22.9
Ntsi E 4	82	98	3.1	22.7
Phaloane E 4	83	61	2.4	17.1
Ponoane E 4	95	143	2.6	11.8
Rabotsoa I 2	89	33	1.8	5.8
Ralejoe D 4	89	83	2.4	20.4
Ramakha C 3	94	14	2.2	17.4
Ramotsoana G 5	93	37	1.8	13.6
Ratau E 3	90	62	1.8	11.0
Thaba Bosiu B 2	81	54	2.6	21.7
Thaba Khupa A 3	77	145	2.7	17.9
Tloutle F 6	82	79	2.5	22.4
Tumahole G 5	86	66	2.1	30.5
Study Area	87	82	2.5	18.5

The codes after the names of the areas are map references to Fig. 1.3
HH = households

Source: 1. Air photo interpretation 2. 1976 population census
3. 1974 prelisting

APPENDIX G

THABA BOSIU RURAL DEVELOPMENT PROJECT AREA (AREA I)

DENSITIES ON CULTIVATED LAND (PEOPLE/HA)

Area		Observed	Predicted*	Residual
Boinyatso	B 5	3.2	3.1	0.2
Jobo	B 3	3.0	3.2	- 0.2
Mafefoane	D 6	6.4	5.6	0.8
Makeneuoe	F 5	2.2	1.9	0.3
Makhabane Makotoko	G 2	1.6	1.5	0.1
Makhalanyane	A 4	3.9	3.8	0.1
Makotoko Makotoko	G 2	1.8	1.7	0.1
Maloto	F 5	2.1	2.1	- 0.1
Masupha Maama	C 6	2.7	2.9	- 0.2
Masupha Makotoko	H 2	1.2	1.6	- 0.4
Matela	F 2	2.4	2.7	- 0.3
Matete/Lebamang	D 7/E 7	2.7	2.6	0.1
Mohalenyana	D 4	2.3	3.2	0.1
Molengoane	F 4	2.6	2.1	0.5
Mothobi	I 3	1.7	2.3	0.4
Mpao	D 3	2.9	2.1	0.8
Musuoe Theko	G 4	2.1	2.5	- 0.4
Nqheku	H 4	2.3	2.2	0.1
Nqosa	F 2	1.7	1.7	0.0
Ntsane	C 3	2.3	2.3	0.0
Ntsi	E 4	3.1	2.9	0.2
Phaloane	E 4	2.4	2.9	- 0.5
Ponoane	E 4	2.6	1.8	- 0.2
Rabotsoa	I 2	1.8	2.2	- 0.4
Ralejoe	D 4	2.4	2.4	0.0
Ramakha	C 3	2.2	2.1	0.1
Ramotsoana	G 5	1.8	2.1	- 0.3
Ratau	E 3	1.8	2.2	- 0.4
Thaba Bosiu	B 2	2.6	3.0	- 0.4
Thaba Khupa	A 3	2.7	3.2	- 0.5
Tloutle	F 6	2.5	2.9	- 0.4
Tumahole	G 5	2.1	2.8	- 0.7
Study area		2.5	2.6	

* calculated by multiple regression analysis
$r_2 = 0.88$
$r^2 = 0.78$
The codes after the names of the areas are map references to Fig. 1.3

Imports.

	1928		1929		1930		1931		1932		1933	
	No.	*Value.*	*No.*	*Value.*	*Quantity.*	*Value.*	*Quantity.*	*Value.*	*Quantity.*	*Value.*	*Quantity.*	*Value.*
		£		£		£		£		£		£
MERCHANDISE	—	881,767	—	669,008	—	431,534	—	389,237	—	404,041	—	362,986
Livestock.—					*No.*		*No.*		*No.*		*No.*	
Horses, Mules, etc.	1,350	1,855	251	501	12	34	12	70	16	67	40	98
Cattle	4,772	11,239	2,428	6,351	645	1,526	436	996	349	793	1,264	1,691
Sheep and Goats	716	1,541	149	207	312	163	344	144	838	275	783	210
Grain.—	*Muids.*		*Muids.*		*Bags.*		*Bags.*		*Bags.*		*Bags.*	
Wheat and Wheat Meal... ...	6,920	10,460	5,415	8,837	5,179	6,760	4,917	7,529	3,894	6,386	8,675	10,381
Maize and Maize Meal	15,289	10,925	25,049	17,398	61,416	30,318	139,901	63,302	95,718	41,880	356,158	217,007
Kaffir Corn	3,399	3,124	4,315	3,030	10,828	7,090	1,374	1,015	1,983	1,291	25,018	17,028
Other Produce	—	663	—	1,084	—	524	—	440	—	378	—	1,709
Totals ...	—	£921,574	—	£706,416	—	£477,949	—	£462,733	—	£455,111	—	£611,110

Exports.

		£		£	*No.*	£	*No.*	£	*No.*	£	*No.*	£
Livestock.—												
Horses, Mules, etc.	32	233	104	534	58	330	178	717	308	1,218	52	144
Cattle	1,538	7,165	1,496	6,678	3,617	14,121	8,337	27,616	5,668	15,947	17,491	41,665
Sheep and Goats	—	—	26	25	1,103	552	2,420	497	1,456	293	3,831	1,423
Grain.—	*Muids.*		*Muids.*		*Bags.*		*Bags.*		*Bags.*		*Bags.*	
Wheat and Wheat Meal... ...	118,280	131,414	72,103	64,408	131,308	105,330	103,706	90,888	196,873	168,015	55,822	45,102
Maize and Maize Meal	100,774	59,295	87,404	42,144	6,061	2,169	295	168	1,908	765	107	71
Kaffir Corn	30,969	18,530	37,056	21,334	4,032	2,374	10,247	6,821	6,500	3,461	1,561	806
Barley	138	86	90	50	224	63	89	22	97	38	91	36
Beans and Peas	2,371	3,166	4,312	5,461	5,873	4,233	4,119	2,214	3,845	1,805	603	361
Wool and Mohair.—	*Lb.*		*Lb.*		*lb.*		*lb.*		*lb.*		*lb.*	
Wool	12,725,153	610,750	12,937,198	436,083	9,729,169	156,601	9,325,140	98,304	11,832,391	105,435	9,864,043	196,146
Mohair	1,921,189	139,484	1,961,746	94,352	942,725	21,837	1,241,743	21,442	1,033,863	10,136	1,926,180	26,697
Hides and Skins.—												
Hides	607,428	31,817	445,286	15,126	359,767	3,747	119,619	679	43,778	203	167,615	1,577
Skins	406,480	11,002	365,039	8,327	371,620	6,044	186,015	2,013	102,730	770	1,193,759	15,551
Miscellaneous	—	413	—	272	—	225	—	45	—	192	—	578
Totals	—	£1,013,392	—	£694,794	—	£317,626	—	£251,427	—	£308,278	—	£330,157

Note: A bag = 200 lbs.

Source: Colonial reports

IMPORTS.

Description.	1934.		1935.		1936.		1937.		1938.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£		£		£
Merchandise	—	405,859	—	498,992	—	524,500		683,578		678,260
Livestock :—	*No.*		*No.*		*No.*		*No.*		*No.*	
Horses, Mules, etc.	6	18	76	297	182	759	1,806	6,514	2,704	10,677
Cattle	157	354	436	1,213	2,889	8,797	4,599	14,357	6,715	24,376
Sheep and Goats	24	21	77	43	73	61	629	554	2,303	1,239
Grain :—	**Bags.*		**Bags.*		**Bags.*		*Bags.*		*Bags.*	
Wheat and Wheat Meal ...	10,051	14,770	5,900	8,311	6,580	8,446	6,378	9,282	8,087	12,852
Maize and Maize Meal	138,779	97,105	101,531	51,476	207,735	145,728	55,515	37,049	33,017	18,988
Sorghum	78,051	47,956	50,229	26,696	23,518	22,868	10,663	8,651	2,222	1,820
Other Produce	—	684	—	1,303	—	966		751		914
Total Imports	—	£566,767	—	£588,331	—	£712,125		760,736		749,126

EXPORTS.

Livestock :—	*No.*	£	*No.*	£	*No.*	£	*No.*	£	*No.*	£
Horses, Mules, etc.	191	844	100	521	53	313	102	575	109	730
Cattle	17,173	53,574	3,189	14,943	6,613	34,365	4,954	25,885	3,243	21,358
Sheep and Goats	2,971	1,542	1,138	730	43	37	—	—	503	340
Grain :—	**Bags.*		**Bags.*		**Bags.*		*Bags.*		*Bags.*	
Wheat and Wheat Meal ...	89,545	88,919	181,090	152,315	96,250	65,796	171,441	132,386	152,776	155,807
Maize and Maize Meal	1,675	1,048	8,105	2,574	395	284	4,858	1,864	26,196	11,514
Sorghum	73	54	184	109	656	589	2,518	1,215	52,770	35,614
Barley	275	146	1,108	428	276	107	750	287	2,080	1,019
Beans and Peas	262	273	4,582	3,727	2,544	1,641	1,752	1,092	4,761	3,082
Wool and Mohair :—	*lb.*		*lb.*		*lb.*		*lb.*		*lb.*	
Wool	5,093,858	118,744	6,410,589	131,198	5,986,871	154,329	4,662,779	142,899	6,461,852	125,241
Mohair	702,018	12,602	830,245	22,513	817,849	42,124	782,221	57,615	870,651	41,584
Hides and Skins :—							*lb.*		*lb.*	
Skins	180,757	1,850	49,596	462	95,806	1,762	132,483	3,300	84,590	1,450
Hides	352,524	4,755	104,753	1,459	60,091	764	62,823	1,253	40,171	1,001
Miscellaneous	—	171	—	166	—	82		258		1,431
Total Exports	—	£284,522	—	£331,145	—	£302,193		368,629		401,512

* A "bag" contains 200 lb.

Source: Colonial reports

Trade

Imports

Livestock	*Number*			*Value in £'s Sterling*		
	1960	*1961*	*9162*	*1960*	*1961*	*1962*
Horses, Mules & Donkeys	4,842	4,328	4,002	52,946	60,845	52,080
Cattle	19,527	18,752	19,956	273,378	270,164	370,119
Sheep & Goats	4,633	9,340	6,602	11,582	22,580	26,408
Total				377,906	353,589	398,760
Grain	*Bags*	*Bags*	*Bags*			
Wheat & flour	42,480	37,813	42,168	116,037	107,525	116,118
Maize & Meal	231,301	153,350	17,118	462,602	356,278	534,336
Sorghum	2,921	4,854	11,635	15,842	13,571	33,822
Other Produce	–	–	–	13,255	4,097	14,965
Merchandise	–	–	–	142,873	2,224,365	2,432,518
Total				4,088,155	3,059,525	3,131,759

Exports

Livestock	*Number*			*Value in £'s Sterling*		
	1960	*1961*	*1962*	*1960*	*1961*	*1962*
Horses, Mules & Donkeys	34	33	88	370	352	968
Cattle	10,379	8,491	8,828	186,822	105,275	185,388
Sheep & Goats	3,151	2,050	1,373	7,877	6,882	4,537
Total						190,893
Grain	*Bags*	*Bags*	*Bags*			
Wheat & flour	39,348	25,633	59,723			156,015
Maize & meal	423	320	–	1,033	928	–
Sorghum	5,826	3,322	1,343	7,574	7,676	1,343
Beans & Peas	13,129	19,129	24,271	52,516	86,660	100,849
Total						258,207
	lb.	*lb.*	*lb.*			
Wool	6,786,356	7,356,426	8,523,299	731,513	804,656	869,376
Mohair	1,180,670	1,266,125	1,511,801	329,456	364,314	367,332
						1,236,708
	Units	*Units*	*Units*			
Hides	30,129	11,657	79,653	23,972	11,982	19,355
Skins	67,612	80,575	139,402	21,467	22,584	6,634
Grand Total						25,989

Source: Colonial reports

THABA BOSIU RURAL DEVELOPMENT PROJECT AREA (AREA 1).

Population Distribution – 1976 (1 dot = 10 people)

Compiled and drawn by S M MAKHAKHA from airphoto interpretation and field survey in 1976. The 1:50 000 topographic sheets by D O S were used for control.

THABA BOSIU RURAL DEVELOPMENT PROJECT AREA (AREA 1).

Basic Topographic Map